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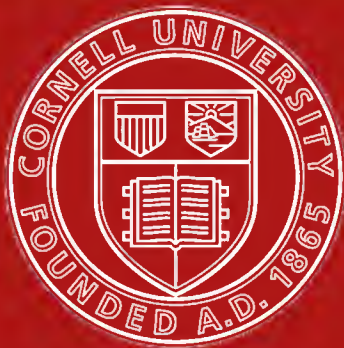
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N O T E S

on

MAJOR SURGERY

From the Lectures of

W I L L I A M L . Z U I L L , M . D . , D . V . S .

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Compiled and revised for
the Undergraduates of the

V E T E R I N A R Y D E P A R T M E N T

by

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PART II.

MAJOR SURGERY.

CHAPTER I.

THE ANATOMICAL FOOT, comprises all below the carpus (knee), or tarsus (hock): i.e., the canons, rudimentary metacarpals and metatarsals, the three phalanges and the various tendinous, nervous and vascular structures which surround these bones. The Surgical Foot comprises only those structures within the horny box called the hoof. The hoof is an epidermal growth analogous to a finger-nail. "For a complete description of the anatomy of the "surgical" foot the reader is referred to Chauveau's Anatomy, or to Zundel's work entitled, "The Horse's Foot." In these notes only the briefest mention will be made of the most important anatomical features of each of the important structures of the foot, with a view to, bringing them to mind.-Adams."

BONES. I. Pedal bone, Os Pedis, Third Phalanx, "Coffin Bone". It is in form an obliquely truncated cone, having three faces, three borders and two lateral angles.

1. Anterior face presents porosities, the preplantar fissure, and the patilobe eminence (first described by Bracy Clark).

2. Superior face shows two glenoid cavities and an antero-posterior ridge.

3. Inferior face shows semilunar crest, plantar fissures, plantar foramina.

1. Superior border shows pyramidal eminence and two lateral facets.

2. Inferior border is thin, convex and cribbed with porosities.

3. Posterior border has facet for navicular bone.

Lateral angles show basilar and retrossal processes, and origin of preplantar fissure, and give attachment to the lateral fibro-cartilages.

STRUCTURE; compact and thick above; semilunar sinus in the centre.

DEVELOPMENT; single centre of ossification. In old horses the lateral cartilages may progressively ossify and form "side-bones".

II. NAVICULAR BONE; Small Sesamoid, "Shuttle Bone". Navicular (navis-boat) means boat-shaped. This bone shows a superior face having two glenoid cavities and a median ridge, an inferior face covered by cartilage; an anterior border having a groove of insertion and a diarthrodial facet; a posterior border and two extremities for ligamentous insertion.

III. SECOND PHALANX; Os Corona, or Short Pastern- is considered a part of the foot because its lower one half is below the coronary band and within the hoof. This bone is cubical and has, therefore, six faces of which the two lateral are roughened for insertion, and the inferior exhibits two condyles.

LIGAMENTS are, I. First Interphalangeal are, six bands which attach the glenoidal fibro-cartilage to the first phalanx; two lateral ligaments; tendon of anterior extensor of the phalanges.

- II. Second Interphalangeal ligaments are five in number- an interosseous from pedal to navicular bone, two anterior lateral and two posterior lateral.

The anterior lateral ligaments are important; they are two thick bundles of fibres about one and a quarter inches long, spread out at their upper extremity upon the lateral faces of the os corona as far up as the nutrient foramen. Below they are attached to facets on the superior border of the third phalanx at the base of the pyramidal eminence. They are covered by cartilage from the third phalanx, cover the synovial membrane of the joint, and are continuous by their anterior margins with the common extensor tendon of the phalanges.

The posterior lateral ligaments are continuations of the lateral ligaments of the first interphalangeal articulation. On reaching the pedal bone they send one branch to the extremity of the navicular bone, another to the retrossal process, and a third band to internal face of the lateral cartilage.

FIBRO-CARTILAGES OF THE PEDAL BONE; are two in number and complete the third phalanx posteriorly. The plantar cushion is between them and protects the flexor tendons from injury. Each lateral cartilage has two faces, and four borders.

1. External face is convex and pierced for veins.

2. Internal face is concave, and covers in front, the pedal articulation, and the synovial cul-de-sac which projects between the two lateral ligaments of that joint; below and behind this face unites with the plantar cushion.

1. Upper border is usually convex, and is thin and bevelled.

2. Inferior border, attached in front to basilar and retrosal processes, and the patilobe eminence, and behind is reflected inwards upon the lower face of the plantar cushion.

3. Posterior border is oblique from above downward and from before to behind, and joins the other two. It forms the cartilaginous bulb of the heel.

4. Anterior border is oblique in the same direction, and is confounded with the border of the anterior extensor of the phalanges, and with the anterior lateral ligament.

STRUCTURE: These cartilages are a mixture of fibrous and cartilaginous tissue whose proportion varies much in different parts. The cartilages of the fore feet are thicker and more extensive than of the hind ones, and the internal is thicker than the external. Each cartilage approaches the true hyaline type- white, flexible and brittle, especially forwards and near its base. It is also more truly cartilaginous on its external surface than in its deeper parts. Towards its posterior part it presents a greater amount of fibrous texture, the cartilaginous nuclei being surrounded with an entirely fibrous substance. "The vitality of the cartilage is in inverse ratio with its density and consequently is greater in its posterior part than towards the base and anterior extremity." This disposition of tissues explains why it is that the cartilages begin to ossify anteriorly, and necrose posteriorly; the former process requiring cartilaginous, and the latter requiring connective tissue. The necrosed cartilage seems never able to separate

itself by a line of demarcation as will a piece of necrosed bone. Use care not to open the bursa of the articulation of the second and third phalanges. This bursa is prominent, close to the lateral cartilages, and just between the anterior lateral ligaments. The cartilage is removed in thin chips by the drawing knife, or sage knife, taking care to preserve the deep fibrous layer.

PLANTAR CUSHION:~ "is a kind of wedge situated in the space between the lateral cartilages, and between the perforans tendon and the lower part of the horny box". It has two faces:- a base, a summit, and two lateral borders.

1. The antero-superior face is concave from above downward and is moulded to the inferior face of the perforans tendon.

2. The postero-inferior face is covered by keratogenous membrane, and presents at its middle a pyramidal body exactly like the frog, i.e., in front a single wedge shaped point, and behind two divergent ridges which embrace the Median lacuna, and end in the "bulbs of the heels".

3. The summit is convex and is fixed into the plantar face of the pedal bone in front of the semilunar ridge and the insertion of the perforans tendon.

4. The base is cleft by the median lacuna into the two "bulbs of the heels".

5. The two lateral borders are wider behind than before, and are in relation with the lateral cartilages.

This cushion consists of a network of recrossing fibrous tissue whose interspaces are filled with loose fibrous and elastic tissue, and adipose cells. When the weight is put upon this elastic wedge it flattens from above downward and widens from side to side, thus spreading the heels. Contracted heels is not a disease in itself, but the symptom of one- usually of navicular disease.

SYNOVIAL MEMBRANES. Anterior extensor and perforans tendon form a true capsular ligament, about the second interphalangeal articulation. The synovial membrane is applied to the posterior face of the anterior extensor pedis. On the anterior face of the second phalanx we have not a synovial bursa, as on the first, but some sero-fatty connective tissue that facilitates movement of the extensor over the bone.

Plantar Aponeurosis, Small Sesamoid (Navicular) Sheath, etc., consult Chauveau.

VASCULAR APPARATUS OF THE FOOT.

This is the richest of the entire body. The collateral artery of the cannon, after receiving blood from the anterior and posterior interosseous meta-tarsal (or carpal) arteries, divides above the great sesamoid sheath between the branches of the suspensory ligament into the two digital arteries, which run to the foot. The internal artery is a continuation of the main vessel. The plantar nerve closely follows these arteries, frequently found in the same sheath. The digital vein follows the same course, but from one-half to three-fourths of an inch anterior to the artery and nerve. The digital artery gives off near the middle of the first phalanx an anterior branch which soon divides into two branch-

es, an ascending and a descending branch- which anastomose with those of the opposite side; at the upper border of the lateral cartilage the artery of the plantar cushion; underneath the lateral cartilages two branches, one anterior along the coronet to anastomose by inosculation with one of the opposite side, and one posterior above the upper border of the small sesamoid bone and beneath the perforans tendon to anastomose with the one of the opposite side. Thus is formed the Coronary Circle.

The "circumflex artery" of the coronary cushion should also be considered. The digital arteries terminate in the Plantar, and Preplantar Ungueal arteries. The plantar ungueals are the larger branches and traverse the plantar fissures, and anastomose in the semilunar sinus to form the plantar arcade. The preplantar ungueals traverse the preplantar fissures and enter the os pedis to join the plantar arcade. From this arcade arteries descend to form the "inferior circumflex artery of the foot."

The venous apparatus is quite complicated, but may be described as an internal (interosseous) and an external.

- I. External venous apparatus of the foot forms a "net whose irregular meshes are extended over, and moulded on, the last two phalanges which are contained in it". Of this reticulated structure there are three parts distinct by their situation, though otherwise continuous. They are:-

1. The Solar Plexus.
2. The Podophyllous Plexus.
3. The Coronary Plexus.

A. SOLAR PLEXUS. The veins of this plexus, remarkably uniform in calibre and forming but few anastomoses with veins of the deep parts, are "sustained in a special fibrous web (plantar reticulum) which replaces the periosteum at the lower surface of the phalanx and is a continuation of the corium of the villous tissue, these veins have little communication, except with each other, and it is even possible to detach the plantar reticulum from the superior face of the third phalanx without disturbing them". "These veins discharge themselves by two canals,- a Central, smaller and less constant, which lies at the bottom of the lateral lacunae of the plantar cushion and embraces the summit of this pyramidal body, and a Circumflex vein, larger, and accompanying the circumflex artery.

B. "PODOPHYLLOUS PLEXUS:- is sustained in the meshes of a fibrous texture (the reticulum processigerum) spread on the anterior surface of the os pedis, in the same way as the periosteum is on other bones, and continuous with the corium of the laminal tissue. These veins anastomose below with the circumflex vein of the solar plexus, and above with the coronary plexus, which is only a continuation of them".

C. CORONARY VENOUS PLEXUS:- is arranged like a garland around the second phalanx, and on the surface of the lateral cartilages of the third phalanx. It proceeds from the two above mentioned plexuses, and for facility of description is divided into a central and two lateral portions.- vide Chauveau.

- I. Intra-osseous Venous Apparatus. The plantar artery has in the interior of the third phalanx a satellite venous system absolutely identical with itself.

NERVOUS APPARATUS OF THE FOOT.

The digital branches, or Collaterals of the Digit are continuations of the plantar nerves and are three in number on each side. They accompany the digital artery and vein which at some points they cross. These three branches separate from one another nearly at the insertion of the suspensory ligament into the sesamoid bones,

1. The Anterior Branch descends in front of the vein to the skin on the anterior face of the digit and to the coronary cushion.

2. The Middle Branch descends between the vein and artery, frequently anastomosing with the anterior and posterior branches, particularly the anterior, and is distributed to the coronary cushion and podophyllous tissue.

3. The Posterior Branch is the true continuation of the plantar nerve, is the largest, and descends first upon and then just behind the digital artery, to the podophyllous tissue of the lateral lacunae, and to the osseous structure of the third phalanx. In its course it distributes ramuscles,

1. Behind the flexor tendons at the fetlock.
2. A satellite branch to the artery of the plantar cushion.
3. A filament arising the lateral cartilage, and passing forward along the arterial coronary circle.
4. A podophyllous division descending from the lateral cartilage to the retrossal process, and posteriorly to the plantar cushion.
5. Several filaments along the plantar ungueal artery to the interior of the os pedis.

THE HOOF AND ITS MATRIX.

The skin of the first and second phalanges gradually thickens till it reaches the middle of the second phalanx, Where it suddenly becomes transformed into a thick corium, limiting wall or shell known as the hoof. Its great thickness calls for increased nutrition, hence underneath it is very vascular. This excessive vascularity renders quitters very grave. Abundant nervous papillae make this part highly sensitive.

The thickness of the hoof depends on the breed, climate, soil, etc. Where the integument is abruptly modified to become the hoof are two prominent transverse ridges or pads differing in size and in function. The inferior, called the coronary cushion, is the larger and more important. It is the matrix of the wall of the hoof, and forms a rounded, and projecting cornice above the podophyllous tissue. Below it is separated from the podophyllous laminae by a white zone, the coronary fissure. Above, it is separated by a sharply defined groove (perioplic fissure) from a slightly projecting margin, named the perioplic ring, which secretes the horn of the periople.

The coronary band or cushion is convex from above to below, widest in front of the pyramidal eminence, and narrowest behind, of a red or dark color, and covered everywhere thickly with vascular villi.

These villi, whose function it is to secrete the wall of the hoof, are numerous and short in front, fewer and longer as we proceed backward. These papillae are of basement membrane covered with embryonal cells whose function is to secrete horn, and each papilla has an artery, a vein, a lymphatic, and a nerve ending. In these respects this tissue is the richest in the entire body. The blood supply of the coronary cushion is from the anastomosing branches the coronary plexus above, and the preplantar vessels below.

The Perioplic Band is similar in function. On reaching the lateral cartilages near the heels it widens out suddenly and disappears into the tissue of the frog. This band is quite thin, and supplies the varnish to the horn. It is limited above by the last row of hairs. The terms laminae, lamellar tissue, laminar tissue, laminal tissue, and podophyllous tissue are synonymous. These laminae are five or six hundred in number, parallel, and extend from the white zone to the edge of the sole. They are narrower above than below, and each side of each lamina is fluted lengthwise by about sixty parallel lamellae, and each lamina is terminated by several papillae. The laminae are all of equal width, but decrease in length from the toe to the heels. This podophyllous membrane is very resisting. Its basement membrane is fibrous, and extends into the bone of which it is the true periosteum. This membrane is called the processigerum reticulum, is very vascular, and in inflammations gives rise to so much swelling as to make the removal of a great deal of horn necessary to relieve the intense pain.

The velvety tissue (fleshy sole) of the sole of the third phalanx is usually pigmented, otherwise it is of a bright red color. Its basement membrane is so vascular that the tissue may often be separated from the bone without rupturing any vessels. This tissue necroses readily. Its function is to secrete the sole.

HOOF, divided into Wall, Sole and Frog.

- I. WALL is inflected inward around the bulbs of the heel between the frog and the border of the sole to form the "bars". The angle of inflection we call the "buttresses" or "arches"; they support the heels, strengthen the foot, and afford attachment to the "glomes" of the frog. The "bars" thus form with the lower border of the wall acute angles opening forward. They also form the external sides of the lateral lacunae of the frog. The middle, or anterior part of the hoof is called the "toe"; the lateral regions constitute the "quarters"; the angles of inflexion of its extremities form the "heels", while the extremities themselves are termed the "bars".

Externally: The profile of the toe should make an angle with the sole of about 55 degrees; the profile of the wall at the quarters should be perpendicular to the ground, at right angles to the sole. Should a heel be contracted this line will lean out above, i.e. form an angle with the sole greater than a right angle.

The wall is covered with the thin, smooth, polished layer of horn varnish secreted by the perioplic ring, and designated the "periople".

The inner face is covered with white parallel leaves that dovetail with the laminae of the podophyllous tissue. Collectively these leaves are called the keraphyllous tissue.

They disappear entirely about half way from the buttresses- heels- to the extremities of the bars. The superior border is bevelled, on its inner aspect, to receive the coronary cushion. This groove is named the cutigeral cavity, because of its relations; its surface is pitted with the mouths of the horny tubes (canaliculi) which receive the villi of the cutiduris- the velvety membrane covering the coronary cushion and secreting the wall. The hardness of the horn depends on its distance from the point of formation. Its color varies, may be white or dark.

- II. THE SOLE is concave below, and notched behind to receive the frog, from which it is separated by the bars. The wall and bars being of a more resisting nature than the sole, wear away with greater difficulty and therefore, project somewhat beyond the surface of the sole. The upper surface is pitted to receive the villousities of the keratogenous membrane (velvety tissue).
- III. THE FROG is an elastic wedge moulded to the inferior face of the plantar cushion. It is "V" shaped, with a central depression called the median lacuna on the inferior surface. Between the branches of the frog and the bars are two depressions, named the "lateral lacunae". The diverging branches of the frog, are at their posterior extremities rounded and elastic, cover the buttresses, are continuous with the periople, and are named the "glomes".

The superior surface is cribbed with porosities to receive the villousities of the cutigeral membrane which covers the pyramidal body of the plantar cushion. This surface presents in the centre a spine named the "frog stay". The elasticity of the frog is due to the wavy course of the fibres constituting it. These fibres pass in a sinuous path from the plantar cushion to the external (inferior) surface of the frog. The fibres of the wall are straight.

The periople is the secretion of the perioplic band, and is more dense than the wall which lies underneath. The perioplic and coronary bands, and the velvety tissue (keratogenous membrane) are the only tissues of the foot that secrete true horn. The lamellar (podophyllous) tissue secretes a single layer of embryonal cells (not horn) which agglutinate (glue together) the horn of the wall and that of the sole- the line of union where these cells are visible being designated the "white line".

The wall itself is an agglutination of tubes which descend from the papillae of the coronary band. Each papilla is a mould about which a tube is formed. A solution of Potash salts will macerate these tubes apart.

Horn may be colored black by sulphuric acid, yellow by Acetic acid. Metallic salts in solution, e.g. Villate's Solution, and Tar will render horn dry and brittle and are injurious if used too abundantly. On account of this drying action on horn, tar, creolin, carbolic acid, or Calomel- a mercurial salt- are often used to combat thrush.

PHYSIOLOGY OF THE TISSUES OF THE FOOT.

The secretion from the perioplic band is hard, smooth and varnish-like, impervious to moisture and destined to prevent evaporation of moisture from the wall of the hoof. The function of the perioplic secretion (periople) is shown in two ways:-

- 1st. If the horn of the wall and periople is stripped from the coronary and perioplic bands, and a compress water dressing is applied, in a few days thin, yellow, unctuous (greasy), semitransparent cells will grow down from the perioplic band, and in ten days or two weeks may reach the lower border of the hoof. This, the periople, is the first layer formed.
- 2nd. If the perioplic band be destroyed, the horn secreted by the coronary band will be lumpy, very hard and very brittle. These objectionable qualities are due to the exposure to the drying action of the air, of the wall deprived of its protecting periople.

PATHOLOGICAL CONDITIONS of coronary and perioplic bands.

The condition often seen in mules in which there is hypersecretion from the perioplic band, is called "Crepodine". The periople, due to hypersecretion, fissures and cracks in all directions. This hypersecretion is due to extreme and continued wet or dry seasons, and is often called, "thrush of the perioplic band". The coronary band usually remains unaffected. Horses working in the mud of a tow-path are frequently affected with Crapaudine. The hypersecreted material is of a varnish-like consistency, pulpy and consists of epithelial cells which are white or black according to the pigment in the perioplic band.

It requires from eight to ten months to replace an extirpated portion of the wall of the hoof, i.e. for the horn to grow down from the coronary band to the ground. After an operation, removing a portion of the wall, the periople first descends and covers the raw surface, but it requires from eight to ten days for the horn of the wall to come well out from the coronary band. A horn tumor is frequently produced by an inflammatory hypersecretion caused by an operation.

If the coronary band is destroyed, in a few days a soft, unctuous semi-liquid horn descends from the perioplic band and covers the lamellae of the podophyllous tissue for a depth of two or three millimetres ($1/12$ - $1/8$ inch), and soon hardens and desquamates on the surface to form a fine powder. This perioplic secretion will never attain the thickness of the original wall, but will effectually preserve the laminae beneath.

If the podophyllous tissue be destroyed, horn from the coronary and perioplic bands will descend to the ground in a year and fill up the gap completely, but where the "white line" should be we find a solution of continuity i.e. a crack between the wall and the face of the os pedis, which may admit a knife-blade. This proves that the lamellar tissue acts as a bond of union between wall and foot. In order to get union it is necessary for the secretions from the coronary band and podophyllous tissues to meet

when both are youngest and most miscible, i.e., at the point where the coronary and podophyllous tissues meet. Here embryonal cells from both tissues meet and agglutinate. The laminar secretion facilitates the downward sliding of the wall from the coronary band by lubricating the laminae, while it also forms a bond of union. In healthy physiological conditions the podophyllous tissue secretes only enough horn for its purpose; but when chronically inflamed, as in Chronic Founder, it will continue to secrete so long as the inflammation lasts. This inflammatory secretion is met at the superior extremities of the podophyllous tissue by the descending wall and gradually pushed downward toward the sole at which point its greatest accumulation will be found. The podophyllous secretion will therefore be wedge-shaped, edge upward-, for the secretion at the upper part of the podophyllous tissue has not the same opportunity to lift the wall near the coronary band as it has nearer the sole. This wedge forces the wall out at the toe, crowds the os pedis downwards and backwards upon the sole, causing it to bulge ("drop-sole").

The sole is secreted by the velvety tissue, or keratogenous membrane, as is easily proved by stripping off the sole, and awaiting growth. There is sometimes a double sole, caused by the original sole being separated from the velvety tissue by pus, and a new sole being subsequently secreted by this membrane. Therefore, when such an old pus cavity is opened the velvety tissue is not exposed, as it is covered by the inner sole. The secretion of the velvety tissue (sole) unites with the secretion of the coronary band (wall) through the medium of the secretion of the podophyllous tissue. The sole, however, will not unite with the wall if the latter is kept from the podophyllous tissue from the coronary band to the sole.

Properly speaking, the hoof is not a secretion at all, but rather a peculiar modification of epithelial cells. The nature and quality of horn vary with the age and condition of the animal; well nourished animals having softer hoofs than anaemic animals. Crapaudine indicates a superabundance of moisture; contracted heels may indicate a lack of moisture in the hoof. The wall is thought by many to grow faster at the toe than at the heels, but this is not so; the coronary band everywhere secretes horn with great uniformity. The length of the wall depends upon the amount of wear it has undergone. The heel, not being nailed to the shoe, rises and falls at each step and the horn at this point is worn away faster than at the toe; this makes the toe appear to grow faster than it really does. Whatever increases the supply of nutrition to the horn-producing tissues facilitates the growth of horn. The wall is worn away by contact with the ground, or cut away by the farrier; the sole exfoliates when a proper thickness is attained. The villousities of the keratogenous membrane are tactile as well as secretory.

PHYSIOLOGY OF LOCOMOTION:-

The fore limbs act as columns of support, bearing about five-eighths of the total body weight; the hind limbs act as organs of propulsion, as well as of support. It is important to notice how the anterior limbs are attached to the thorax.

The thoracic cage is swung between the scapulae by means of the serrati magni and angulares muscles which pass from the upper extremities of the scapulae to the cervical vertebrae, and ribs near the sternum. The pectoral muscles also materially assist in upholding the thorax. The scapulo-humeral, humero-radial and metacarpophalangeal angles of the fore limbs; the cartilage in the articulations, and the muscular sling in which the thorax is suspended dissipate concussion. The scapulo-humeral and coxo-femoral angles open toward each other, and in their action may be compared to two carriage springs. The biceps keeps the scapulo-humeral angle open. From the elbow down, the bony ray is perpendicular as far as the first phalanx.

There are more open angles in the hind leg and constant muscular effort is necessary to keep them from closing. Here the muscular system is enormously developed, and there are large bony attachments. These numerous open angles are necessary, because the hind legs are attached directly to the vertebral column through the medium of the sacrum, and thus every ounce of force in the hind legs is transmitted, without loss, to the spinal column. The fetlocks act as springs; the phalanges forming with the cannon bones an angle of about 155 degrees. The angle of the fetlock with the ground surface is, therefore, about 65 degrees. Now, the wall of the hoof at the toe should form an angle with the ground surface of about 55 degrees, therefore, the wall at this point and the phalanges do not form a continuous straight line, as affirmed by some writers. The weight upon the fore legs is resolved when it reaches the fetlocks. One-third of the weight falls upon the sesamoids, and flexor tendons, while two-thirds follows the direction of the phalanges to the os pedis. The suspensory tendon is quite elastic. The perforans tendon receives at its upper third the "check tendon," and hence acts as a suspensory ligament. The mule has no "check tendon" in the hind legs. Over-reaching throws great strain upon these tendons and may cause lameness.

The movement between the first and second phalanges is less than between the first phalanx and the cannon; this is due to the attachments of the perforatus flexor and the extensor tendons of the phalanges. Hence it is that ankylosis of the first interphalangeal joint don't interfere much with slow work. A small portion of the two-thirds of the five-eighths total body-weight is disintegrated here, the remainder is disintegrated on navicular bone and os pedis. The navicular bones are swung at their extremities between branches of the posterior lateral ligaments of the second interphalangeal articulation. The weight here tends to press this bone against the perforans tendon, to bury the os pedis in the hoof, and to rock it backward.

The coronary band receives considerable weight, and transmits it to the wall, thence to the ground. The 640, or more, laminae of podophyllous tissue also assists in swinging the os pedis. The plantar cushion prevents the third phalanx from rocking backward. The velvety tissue does not, as is usually supposed, support the foot, and is never bruised by blows upon the sole, being, in fact, highly resisting. A horse can trot without a sole.

The plantar cushion rests upon the frog and acts as a support and protection to the tissues of the foot. Lafosse says, "the elasticity of the foot is due to the hoof, itself". Clarke says, "that this elasticity depends upon the arrangement of its component parts". Bourgelat says, "that when a weight is brought upon the foot the whole horizontal circumference of the foot increases". Peria says, "that the hoof dilates from the toe to the quarters, and contracts posteriorly." Dr. Zuill says, "that the dilatation occurs in the middle of the lateral lacunae."

TOPOGRAPHICAL ANATOMY OF THE FOOT.

The plantar surface of the foot is divided into three regions or zones, by two transverse and parallel lines. These zones are Anterior, Median and Posterior.

- I. ANTERIOR ZONE is all that part of the ~~foot~~ plantar surface anterior to a line drawn from side to side across the sole at the point of the frog. It consists of horn, velvety tissue and os pedis.
- II. MEDIAN ZONE is limited in front by the anterior zone, and posteriorly by a line drawn from side to side across the foot crossing the anterior point of the median lacuna of the frog. It includes the branches of the frog, the sole, plantar cushion and plantar aponeurosis. The latter glides over the inferior face of the navicular bone. This bone may be inflamed by the irritating presence of foreign bodies, its cartilage may peel off under the influence of a periostitis or of an estitis, or there may be a necrosis of this bone which may invade the lateral cartilages, and produce a suppurative arthritis.
- III. THE POSTERIOR ZONE comprises the posterior frog, plantar cushion, and cartilaginous bulbs, or "glomes" of the heels.

The tissues comprised within the horny box are, with few exceptions, highly vascular, and granulate with great facility. Inflammation in the foot is accompanied by its characteristic symptoms; swelling, pain, heat, redness, and loss of function. Obviously the redness and swelling can rarely be seen. Only heat, pain and loss of function are cognizable. The arteries being deep-seated and having bony walls escape compression; while the superficially situated veins are compressed, occluded, and moist gangrene may soon set in. The pain is excursive (flitting) and excessive when at its worst. The lameness may be slight or intense. To recognize the lameness, it may be necessary to trot an animal over hard pavement or soft ground. If the lameness is increased upon the pavement it will generally be in the foot, though it may be a splint lameness. If lameness is increased when trotted on a soft surface, it is generally due to an arthritis situated higher up the leg. A peculiar movement, called the "isochronous" movement, indicates foot lameness. The foot is often carried forward and rested with the point of the toe on the ground, and the heel alone seen to rise and fall at each pulse wave; or the whole foot participates in this movement. Flexing the knee or hock will usually indicate any lame-

ness situated above the foot. Always examine the foot for heat. Swelling is due to a transudate of serum in the affected part. This transudate ultimately assumes the character of pus, and discharges itself at the union of the hair and hoof. Gangrene of the podophyllous and keraphyllous tissues usually results. The pus indicates a breaking down of adjacent tissues. Do not be misled by a healthy condition of the laminar tissue, for pus may be beneath the processigerum reticulum, next to the os pedis, in which situation but 24 or 48 hours are necessary to produce mortification of the keraphyllous tissue. Close driving of a nail may produce this condition.

To repeat a little more in detail; when transudation occurs in the midst of an inflamed organ it assists in the increase of size of the organ. Congestion of blood vessels also assists. The transudate of plastic material macerates and loosens the podophyllous and keratogenous membranes; suppuration becomes established and the pus works up under the coronary band, and discharges at the perioplic band at the border of the hair. Marked symptoms, caused by the compression of living tissues by the transudate and pus, disappear with the escape of the pus. If an incision be made through the horn from 24 to 48 hours after the foot has suffered a severe traumatism the inflammatory transudate has not yet formed pus and will flow out as a thin blackish liquid. This liquid has macerated the horn and contains suspended in itself many embryonal horn cells which, by the pigment they contain, color the fluid. When this dark liquid has become "fatty" it indicates mortification. The symptoms when pus is found are different, and the dark liquid is found to be either "fatty" or "saneous", showing that mortification has begun. Should the pus form underneath the periosteum of the third phalanx and be difficult to locate, cut down with a bistoury through the sole of the foot till some incision reaches the pus pocket. These incisions do no harm.

A deeply driven nail may press the soft horn upon the podophyllous tissue and cause a chronic inflammation at this point. This inflammation results in hypersecretion of horn from the laminar tissue, forming a horn tumor (keraphyllousale). This horn tumor may also follow toe-crack, or quarter-crack. The tumor resting between the os pedis and the wall of the hoof may cause the laminae below it to atrophy; yet so long as they retain any vitality they secrete horn. Finally, this podophyllous tissue and then the bone will necrose. The horn tumor must be removed and the processigerum reticulum scraped away from the bone, or the tumor will return as soon as a compress bandage is applied. No degenerated or atrophied tissue must be left. A fissure or seam of the wall usually results from the healing of a suppurating coronary band; the coronary band being largely fibrous tissue is prone to suppuration.

As most lamenesses are in the foot, always examine this member even when you know the lameness to be elsewhere. Make this an invariable rule. If this is done many causes of lameness can be excluded. See that there are no more holes in the wall than there are nails. Explore the plantar surface with a hoof knife for "street nail".

Test the hoof with pincers. Remove the shoe and examine each nail for a split, bend, or for purulent matter adhering to it. If nothing is found, pare down the sole somewhat, in a further examination.

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CHAPTER II.

D I S E A S E S O F T H E F O O T .

CORNS, are more or less deep contusions situated under the horn within the posterior zone of the foot. The term "Corn" is meaningless. Lafosse makes two classes of corns:-

1. Essential or Natural.
2. Accidental.

The causes of each are predisposing and accidental.

Essential corns are due to the natural conformation of the foot. Accidental corns are due to traumatisms.

The terms "accidental" and "natural" also signify the location of the corns, and an accidental corn does not usually occur where natural corns are found.

Feet that are large and high-heeled, or thick-walled, are predisposed to natural corns. Thick walls dry out; the heels contract with great force and the podophyllous tissue of the bars receives this concentrated pressure and a natural corn results. Such a corn is called an "ascending" corn. Its presence may be shown by thinning the bars.

Wide, flat feet with low heels are predisposed to the formation of accidental corns. For, in such feet, the third phalanx tends to rock back and forth and the velvety tissue is violently compressed between the basilar process and the sole of the hoof, small blood vessels are ruptured, interstitial hemorrhage results, and an accidental corn is produced between the wall and bars upon the velvety tissue. Remember! that essential corns are on the podophyllus tissue, while accidental corns are on the velvety tissue.

ACCIDENTAL CAUSES:- Opening up the heels favor essential corns. A thick toe in a wide and low-heeled foot favors accidental corns, while a thick toe in a narrow and high-heeled foot favors essential corns, on the podophyllus tissue. Therefore, shoeing with too thick a calk at the toe favors the production of both kinds of corns by throwing too much weight on the posterior zone. High calks on the heels and none on the toe throw too much weight into the anterior part of the hoof and predispose to accidental corns; at the same time the frog lifted clear of the ground gets no pressure, it atrophies, the heels contract and favor essential corns.

If shoes are left on too long the wall grows out till the heels of the shoes rest on the sole between the bars and wall and favor corns. Thinning the sole, and paring away the bars are fruitful causes of corns. Uneven pressure of a shoe may produce corns, especially upon too thin a ~~xx~~ sole. Paring away the toe or heel affects the distribution of the animal's weight, just as raising or lowering the toe or heel of the shoe.

When a horse has gone long unshod the feet spread and allow greater pressure to come on the sole, the latter becomes less arched and therefore, more exposed, thus predisposing to corns. A small stone may become engaged between the frog and shoe and produce an accidental corn on the velvety tissue of the sole by causing a rupture of a blood vessel, with extravasation of blood.

A corn is only a contusion which has a definite location, namely on the podophyllous or velvety tissue of the posterior zone. Contusions on other parts of the plantar surface are known simply as "bruised sole".

Corns may be on all feet, but more commonly occur on the front feet, because they sustain more than one-half the body weight, and because in stepping the heels of the fore feet strike the ground first, while in the hind feet the toes strike first. Again, corns are more apt to occur on the side of a foot toward the median line of the body, because more weight falls upon this side (evidenced by the greater width of the internal condyles of the bony rays of the limbs). The soles of the hind feet are more arched, and thus less exposed to contusion; and when corns do exist they heal more rapidly than those of the fore feet. A horse with corns usually has contracted heels, and usually the inner heel is the more contracted. There is in contracted heels too little elastic tissue to withstand the concussion of the weight of the body with the ground. The more rapid the gait, and the greater the knee-action, the greater the liability to corns.

Another classification of causes is,

1. Predisposing.
2. Determining (accidental or exciting).
3. Adjuvant.

Adjuvant causes of most foot diseases are climatic changes of temperature and moisture. More corns occur after a dry summer in the North, and after the "dry season" in the South than at any other season. The reason is obvious.

SYMPTOMS:- vary according to the location, extent and age of the corn. They are, Local (objective), and Rational.

LOCAL SYMPTOMS have been discussed.

RATIONAL SYMPTOMS are noticed first. Lameness is a rational symptom. At first lameness may be manifest only when the animal trots; a few days later he walks lame, or when in the stable he carries the foot forwards and outwards, resting it upon the inside toe. The heel may show the "isochronous" movement; or the whole foot may be raised clear of the ground. At this stage the corn is serious. The lameness may be intermittent, i.e. the animal go lame when first driven, but soon warm out of it.

When such symptoms are noticed, remove the shoe. Cutting the clinches, and withdrawing the nails, especially from the inner side, will cause the animal acute pain. When the shoe is off, a blow from the hammer, or pressure with the pincers particularly on the inner side will make the animal flinch. The thinning with the hoof knife should be confined to the bars and sole. The outer layers are generally dry and hard to cut, the inner layers softer. Work with care, and don't nick or lacerate the sensitive tissues, unless suppuration has begun, or you may complicate the trouble.

Pressure with the thumb shows when the horn is thin enough. Thin the sole exclusively for accidental corns, and only the bars and sole for suppurating corns- never the wall. Normal horn is brittle and compact, the yellow horn lying near the keratogenous tissue of a corn is infiltrated with blood and serum and cuts hard. Have a sharp knife.

CLASSIFICATION OF CORNS.

- | | |
|----------------------|-----------------|
| 1. SPRAINED (Acute). | 3. MOIST. |
| 2. DRY. | 4. SUPPURATING. |

These classes represent four distinct degrees of one disease, the degree or intensity of the disease depending upon the intensity and frequency of the cause.

- I. SPRAINED CORN is accompanied only by a simple modification of function, and disappears after a short rest. There is a simple contusion of the velvety tissue without rupture of blood vessels, without abrasion or any inflammation. Thinning the sole will reveal no ecchymoses (blood clots) in or under the horn. Pain has been produced from a simple blow, by violently compressing nerve endings. This class of corns is seldom seen.
- II. DRY CORN:- is produced if the blow is severe enough to rupture a small blood vessel. There is then a slight hemorrhage and an effusion of serum into the horn and adjacent tissues. The new, young, and tender horn cells next to the velvety tissue absorb the coloring matter of the blood and are stained a dark purple color. The cause of the hemorrhage (blow) has now ceased to act, new unstained horn cells are formed on the surface of the velvety tissue, and the stained cells are pushed toward the surface of the sole. As this dark (unoxidized) blood coloring matter nears the surface it gains access to air and is oxidized to lighter shades till it is finally a bright red. Within four or five days the animal is well, and by two months the stain has reached the surface of the sole.
If this bruising be repeated at irregular intervals there will appear layers of stained horn "sandwiched" between layers of unstained horn. There may be six or eight such layers. This stratification proves that the cause has been intermittent. From what has been said it will be understood that the age of a dry corn can be estimated both by the color of the ecchymotic horn and by its distance from the velvety tissue.
- III. MOIST CORN:- is more serious than either the sprained or dry corn. Though there is very little lesion of the velvety tissue, and but few blood vessels are ruptured, yet there is some extravasation of blood, a deep-seated congestion, and an inflammatory transudate which macerates and softens the horn and stains it yellow. It is the serous transudate rather than the slight hemorrhage that saturates and stains the horn, and renders it soft. The sole in this corn is never separated from the velvety tissue.
- IV. SUPPURATING CORN:- occurs when the hemorrhage and transudate of serum is sufficiently abundant to separate the sole from the velvety tissue and the wall at the heel from the podophyllous tissue. Pus forms and causes intense pain (indicated by isochronous movement of the foot) which disappears when the pus having mounted the wall at the heel, escapes between the coronary band and hoof.

The perioplic band will soften, swell, whiten, and become turgid; these appearances indicating a suppurative condition of the foot. When such a condition exists the horse will not rest the heel on the ground till the pus has discharged. When recognized, cut down from above and make a counter opening; and low, empty-heeled horses will usually recover nicely without further treatment, indeed, when once the pus has escaped they may recover without any treatment. In high, mulish heels however, surgical interference is demanded; for the pus collects and macerates the tissues and serious complications may occur. Necrosis may attack the basilar and retrossal processes and involve the lateral cartilages and produce a cartilaginous quittor or a suppurative phlebitis; or the necrosis may attack the plantar cushion, pass through the plantar aponeurosis into the small sesamoid (navicular) sheath and cause a suppurative arthritis, in which case, if the animal should recover, it would be fit only for breeding purposes. Therefore, a suppurating corn may require an operation for "quarter-crack", "quittor", or "penetrating street nail".

DIAGNOSIS:- Easy. Lameness leads you to remove the shoe and examine the foot. The pincers will cause pain upon pressure, or the exploring knife will reveal ecchymotic spots of blood in the horn.

PROGNOSIS:- Depends upon the stage of the corn, i.e. whether it is sprained, dry, moist, or suppurating; whether Natural or Accidental, i.e. on the shape of the foot; and whether, or not, there are complications of adjacent structures. Prognosis is more favorable in case of Accidental, than of Natural corns.

ALTERATIONS:- Those common to ordinary contusions.

TREATMENT:- is Preventive and Curative.

I. **PREVENTIVE**, or Prophylactic, treatment consists in keeping the horn soft by the frequent application of hoof ointments or ordinary grease, and by proper shoeing. These unctuous applications preserve to the horn its normal moisture and softness by preventing evaporation from its surface.

As to the shoe, the surface on which the foot rests should be perfectly level, i.e. every where in the same plane. If, as too frequently shoes are made, this upper surface of both heels inclines downward and inward toward the position of the frog, like opposite sides of an upright funnel, then under the weight of the body the heels of the foot will tend to descend and be crowded together. If the heels of the shoe must be bevelled let it be downward and outward, not downward and inward. If a horse's heel is very low apply a shoe that gradually thickens from the toe to the heels. As low heels usually have a well developed frog we may apply a bar-shoe, but if the frog be small or shrunken and does not press upon the bar of the shoe we may yet obtain pressure by running in gutta-percha between frog and bar. Many "frog pads" are in use, but few yield satisfactory results. High-calked shoes need frequent attention. One calk may wear down so as to throw the weight too much upon the other heel and thus produce a corn. High calks on very thin shoes may also cause corns.

II. **CURATIVE TREATMENT:-** In minor cases remove the shoe and soften the horn in water, by poultice, wet sponge, wet oakum, etc., as convenience indicates. The water passes into the porous horn, and to a certain extent removes the soreness and inflammation.

Now apply a hoof ointment, for reasons stated, and shoe as in preventive treatment, except that the heels should be lowered to relieve them temporarily from pressure.

If the lameness be intense thin the sole and bars over a greater extent of surface than that occupied by the corn, till the ends of the villi are cut and blood flows. Don't nick the keratogenous membrane. Pressure with the thumb will indicate the thinness of the horn. This thinning relieves the pressure from swelling. Poultice till the lameness disappears, then apply an oil dressing on oakum to the sole, and keep it in place by splints and the proper shoe. If there is an ascending corn thin the horn of the sole and bars, cut down the heels so as to render the frog prominent, and after the preceding "oil dressing treatment", apply a thin-heeled shoe, or one with a screw between the heels and a hinge at the toe. This latter shoe is not advisable because its effects are exerted for only three or four days.

In MOIST CORNS thin the horn as much as possible and apply a pad of oakum wet with Monsell's Solution.

SUPPURATING CORNS cannot be treated in this way; the pus must be liberated as soon as it forms by puncturing the sole. Sometimes a counter-opening is necessary. Apply oil dressing as for "street nail"; make moderate pressure on the sole to prevent downward bulging of the velvety tissue, and to keep down excessive granulations; and apply splints.

If laudable pus has burrowed up to the coronary band, thin away the quarters; but should the pus be thin and bloody then all the horn must be removed from over the pus cavity, for suppuration of other tissues has begun. Curette away all necrosed tissue, down to bone if necessary. All necrosed tissue is foreign matter and irritant. When the os pedis is necrosed the probe will transmit a "gritty" feeling to the hand. Scrape away all necrosed bone. Scrape till you get oozing of blood from the entire bony surface—necrosed bone don't bleed. Apply a quittor dressing.

S E A M S O R C R A C K S . (Fissure).

A solution of continuity of the wall of the hoof. Clinically of two kinds, Toe Crack and Quarter Crack.

Toe crack, may be considerable distance on either side of median line. Quarter crack is found posterior to the widest part of the foot and may involve the sole and bars.

Seams (derived, perhaps, from Lat. semi- half) may be,

(1) Superficial or

(2) Deep; or they may be

(1) Complete when they pass from the coronary band to the sole;

(2) Incomplete when they pass but part way;

(1) Complicated or,

(2) Uncomplicated, according to whether or not other tissues are involved.

Toe-crack called by early writers "ox-hoof".

AETIOLOGY:-

(1) The physiological functions of the foot.

(2) Excessive moisture or dryness.

AETIOLOGY OF TOE-CRACK:- Hind foot more predisposed. Frequent and most serious. Pavements, stony roads and wet tow-paths predispose to this crack. The determining cause of toe crack is traction, which is performed by the posterior limbs in which the toe first strikes the ground. The weight of the animal's body plus the resistance of the load is concentrated upon the second interphalangeal articulation, the os pedis (wedge as it is) is forced downward and forward into the angle between the wall of the toe and the sole. If the wall and sole are in a normal condition they withstand this disrupting strain, but if through an unnatural loss of moisture the wall has become brittle, or through prolonged maceration it is abnormally soft, it will part at the coronary band where it is thinnest. If the coronary band is split a crack is inevitable. An incomplete crack may be prolonged in two ways:-

- (a) By the original cause- traction; or
- (b) by growth of the wall.

Alternate expansion and contraction of the heels tend to prolong a crack into the deeper tissues. Only in rare cases will a seam remain superficial.

AETIOLOGY OF QUARTER-CRACK:- Hard roads, moisture, high knee-action. Usually occur on anterior feet where the heels strike ground first. Less serious than toe-crack.

SYMPTOMS OF TOE-CRACK:- Local for some time. The fissure may remain for sometime in the bevelled edge of the wall. There is no exudate of any kind. Later, under the influence of work the fissure will deepen and lengthen, atmospheric germs and foreign matter will enter from without, and the laminae become inflamed and swollen. Whenever the weight is put on the foot the heels expand and the toe crack closes or cruelly pinches the swollen soft tissues which are extruded. To avoid this pinching the foot is held free of the ground. The lameness is peculiar, the animal appears to hop over his own feet. This gait, which somewhat resembles stringhalt, is called "harping".

At this stage the constant opening and closing of the seam will churn the albumen of the blood, flowing from ruptured vessels of the podophyllous tissue, and produce a frothy liquid which escapes thro' the seam. Pinching and pain occur whenever the animal puts his foot to the ground. There may be considerable hemorrhage. If the animal be now allowed to rest he may recover, especially if the podophyllous tissue be not severely torn, but a keraphyllocele (horn tumor) may form and by pressure upon the laminae cause them to necrose, and ultimately cause death of the processigerum reticulum and os pedis. Often an animal may work a long time and have a keraphyllocele. Necrosis of the third phalanx from this cause occurs only in rare cases.

TERMINATIONS:- The natural recovery of toe-crack is not common. Usually suppuration follows the inflammation, its presence being revealed by the abundant discharge of foetid pus. If the processigerum reticulum is involved the necrosis will attack the bone and rapidly invade the cancellated tissue. In from 24 to 48 hours the whole bone may be necrosed. The necrosis may extend up to the pyramidal eminence and cause a suppurative arthritis of this joint, or in

other directions and cause many serious complications.

ALTERATIONS:- A fissure extending into the laminae. The visible soft tissue is swollen, and dark red in color. Suppuration may exist. Gangrene may follow and will be indicated by the characteristic bad odor of necrosing bone, and a yellowish-green color of the processig. reticulum.

DIAGNOSIS OF TOE-CRACK:- Easy, but difficult to determine whether the crack is simple or complicated. Rational symptoms the best guide. An unwillingness to rest the foot on the ground, and isochronous movement of the foot indicates necrosis of the processig. retic., and possibly of the bone.

PROGNOSIS:- Always grave, for there is an increased probability of the crack returning. Not so serious in early stage of simple crack; may be even suppurating and yet be curable; but if necrosis has gained much headway the animal had better be destroyed.

TREATMENT:-

I. Preventive.

II. Curative.

I. **PREVENTIVE** is hygienic. Maintain a normal pliability of the hoof by the daily application of hoof ointment, or other fatty matters. Petroleum should not be used, for it dissolves the natural fat of the horn, as does ether.

II. **CURATIVE:-** Varies with the gravity of the disease. If the animal is not lame, and the fissure is incomplete prevent it from extending by immobilizing the sides of the seam and resting the animal. The following methods of closing a toe-crack where little or no inflammation exists, have been resorted to with greater or less success.

(1) Shoeing the afflicted foot with a shoe hinged opposite the toe-crack, and having a brace extending inward from one heel to the other. The shoe is nailed in position, and by means of the brace the heels are spread apart, the effect being to close the crack at the toe.

(2) Lafosse nailed the seam together. Much care is necessary in driving the one, two or three nails. Holes for the reception of the nails may be bored with a gimlet or burnt in with a hot wire (the latter renders the horn brittle), copper wire may be run thro' the holes and then twisted at the ends.

(3) Bourgelat applied a circular metal band about the hoof. This method now in disuse.

(4) Ungelard cut two grooves into the wall parallel to the seam, one on either side at a distance of about an inch. Into these grooves hooks were fitted, and the grooves drawn toward each other by turning screws joining the hooks. Tho' this closed the fissure, yet often the traction upon the hooks was sufficient to produce fissures at the bottom of the grooves, and three cracks instead of one, had to be treated.

(5) Vachette has devised the best kind of clasps. They require special instruments for their application, but give real solidity to the means of fixing the position of the parts. The clasps are all prepared, made of strong wire, bent at both extremities, and slightly sharp inwardly. These are secured on the foot by a special nipper or forceps, in the notches made in the wall with a special cautery.

The number of clasps varies with the case under treatment. Do not burn deep enough to compromise the podophyllous tissue. On a thick wall hooks may take a firm hold and do good. Dampen the hooks and so cause them to rust and increase their hold. Fatty substances from the dressing will loosen the hooks and generally cause them to drop out, or be knocked out in a few days.

(6) The use of a "Defays" shoe gives good results at the Veterinary Hosp. of U. of Pa. The most common objection raised is that the shoe is too thin, but it must be thin in order to allow the heels to be spread by the pincers so as to close the crack. Inside each heel a clip is raised so as to press outward against the inner side of the wall at a point just anterior to the reflection of the wall to form the "bars". When the shoe is in position the heels are spread, the natural resistance of the iron to flexion being the obstacle to the return of the heels to their former position.

(7) A good modification of the Defays' shoe is the following:- Take a shoe of uniform thickness, and of ordinary width at the toe. Place a clip on each side about an inch from the crack. From these clips to the heels the shoe is to be rimmed out on the inner border (web) till it is narrow enough to be bent by pincers. Now the wall of the hoof between the two clips is to be cut away so that a space of one-fourth inch will be left between wall and shoe. The shoe is then to be nailed on and the heels spread by the pincers. The coronary band may be stimulated by a blister, or from three to five points of a firing iron. Cauterization by acids, once popular, is now in disuse. Such treatment may cure simple fissure. If the seam extend to the podophyllous tissue, and a Defays' shoe be applied and the animal rested, the wall may close all the way down by horn similar in structure to that of the "white line". Don't trust to the strength of this horn, but allow the shoe to remain on three or four months.

When suppuration exists a poultice of flax-seed or bran, or irrigation must be resorted to, and if the lameness ceases immobilize the sides of the fissure by the 5th, 6th, or 7th, method and a cure will generally result. If the lameness, however, persists, thin the horn on both sides of the crack to remove the pressure from the swollen and sensitive tissue, and apply carefully an oil dressing under a compress of oakum.

When Gangrene is present, as revealed by symptoms, an operation known as the Toe-crack Operation is advisable. Keep food from the animal for 24 hours preceding the operation. On the day before the operation fit to the hoof a "toe-crack shoe", which has a wide toe projecting beyond the wall to support the dressing. If the foot be sensitive to concussion a gimlet may be used to bore the nail holes. Poultice the foot to render the horn easy to cut, and thin the horn from the coronary band to the lower border of the wall for a space of an inch on both sides of the seam. Before casting have in readiness, a pair of curved scissors, three sage knives, a double, right and left; several hoof knives; a tourniquet; thoroughly aseptic oakum rolled loosely and evenly into balls not larger than a hazel nut; several pads of oakum, carbonized oil, antiseptic washes, and a roller bandage about an inch and a half in width.

OPERATION, cast the animal on the side on which you operate and secure the diseased foot above the cannon of the diagonal leg. The horn may now be removed by either of two methods, "stripping", or "thinning".

The "STREPPING" OPERATION is performed as follows:- Cut two groove parallel to the fissure and extending from the coronary band to the bottom of the wall. Each groove is about one and one-fourth inches from the fissure, and in depth reaches the podophyllous tissue. Connect these grooves by a third groove which follows the "white line" between sole and wall. With pincers strip up this circumscribed segment of wall, being careful to apply pressure of the thumbs to the coronary band before the wall is forcibly torn from it. Stripping causes excruciating pain, is unnecessary and therefore is to be condemned as a barbarous practice.

THE THINNING OPERATION is the one most practiced. The wall for an inch on each side of the fissure, having been cut away as much as possible on the previous day, is carefully thinned down to the podophyllous laminae. Don't nick the sensitive tissue. Now remove all loose horn from the edges of the fissure. Curette away all necrosed tissue (color if dark red or violet, or greenish-yellow indicates necrosis) removing if necessary the processigerum reticulum and scraping the bone. A "line of demarcation" can often be seen. If a keraphyllocele exists, cut along each side with a sage knife and remove. Cleanse the wound with an antiseptic wash. The small loosely rolled balls of sterilized oakum are dipped into carbolized oil and packed one at a time with equal pressure into the fissure till they fill it even with the inner surface of the wall. Now as carefully fill the space between the edges of the wall. Apply oakum pads extending well back to the quarters, making the dressing thickest over the fissure. Put the bandage about the middle of the dressing; tie the first turn at the heels (half knot), the second turn is taken around the top of the oakum, passing between the end held by an assistant and the shoe, the third turn is around the bottom, afterward the turns pass in succession from the shoe upward, each overlapping the preceding by two thirds, and all converging toward the knot at the outer heel.

Draw each turn of the bandage tight, and make it more so by creasing it with the ball of the thumb. Leave no pressure on the lateral cartilages. Make final tie at the heels, after passing one or both ends under the entire strand of bandage so as to bind the turns together and prevent any from slipping upward into the hollow of the fetlock. Allow this dressing to remain so long as the animal continues comfortable, not regarding the pain of the operation which may last two or three days. If the pain persists longer, and there are isochronous movements of the foot, remove the dressing and examine the foot for necrosed tissue, a spur of horn, or for granulation tissue. Treat, and dress as before.

QUARTER CRACK is situated on the lateral parts of the wall, towards the heels, and more frequently on the fore feet, especially on the inside.

CAUSES are,

- I. Accidental and
- II. Predisposing.

I. ACCIDENTAL CAUSES are blows and traumatisms,

II. PREDISPOSING CAUSES are the most important, and chief among them are:-

1. The Physiological Functions of the Foot. In rapid travelling almost the entire weight of the horse's body falls in quick succession upon each foot. The fore feet bear more of this weight than the hind, and strike the ground heels first. The structures of the foot that receive this weight are, the coronary band, lateral cartilages, wall, and frog. When the weight falls on a fore foot, the heel first touches the ground; the frog is compressed from above downward, expanding sideways and spreading the heels, the lateral cartilages are compressed, but prevent the basilar and retrorsal processes of the os pedis from rotating backward and downward between the wall and bars far enough to bruise the keratogenous membrane of the sole; the coronary band is compressed by the descent of the second phalanx; the third phalanx descends as far as the slightly extensible laminae which attach it to the inner face of the wall will allow; the navicular bone descends slightly, as the third phalanx makes a slight backward rotation, and the perforans tendon is rendered tense, and the outward pressure of internal structures against the wall is very great. But this internal pressure will never of itself produce quarter crack, so long as the horn is normal. If, however, the horn is dry, hard and inelastic, a crack may be produced. These cracks are more common on the inner quarters, because there the most weight falls and the wall is the thinnest. Horses, the toes of whose feet turn out, support an abnormal proportion of their weight on the inner quarters, and are especially predisposed.

2. Hygroscopic changes, (alterations of moisture and dryness), have as much influence in diminishing the flexibility of the hoof as the dryness alone. Animals working on damp roads; animals taken from pasture and placed in a stable on dry bedding; animals sent into drier climates (army horses); African or Arabian horses (thin-soled) when brought to America and shod, are especially liable to quarter crack.

3. Unskilful Shoeing. Shoes, the upper surface of whose heels inclines toward the median line of the shoe, tend to crowd the heels together and favor contraction. A crack thus produced would be classified by some writers as, "symptomatic", while those due to a traumatism would be called "traumatic".

4. Removal of Perioplic Band. Paring down the frog relieves it of the weight of the body, destroying its function; causes it to atrophy from disuse, and dry out; allows the heels to fall together (contract).

5. Thinning of Sole, and Weakening of Bars, causes the sole to dry out and become more arched, and the heels to approach (contract).

6. Navicular Disease. An animal with navicular disease attempts to travel on his toes so as to prevent the backward rotation of the lateral cartilages and the consequent pressure upon the region of the plantar cushion. A short step is necessary to do this. Therefore, any disease, in or near the plantar cushion, which is sufficiently painful to keep an animal from placing his

weight upon the heel, will while it continues painful effectually prevent a quarter crack. But, if after a long rest an animal with dry, atrophied and contracted frog and heels resulting from navicular disease, goes comparatively sound and travels freely, he is apt to throw a crack. Quittor, suppurative corns and some other diseases act much as does navicular disease.

SYMPTOMS are Local and Rational.

LOCAL SYMPTOMS:-- Vary according as the fissure is complete or incomplete, deep or superficial, simple or complicated. Ordinarily the fissure when first noticed is incomplete, extending from the coronary band about one-third the distance to the sole. For a few days there is no discharge, showing that the fissure is uncomplicated; but if the animal be worked, or even neglected, a frothy bloody albuminous discharge soon appears, the first Rational symptom,-- pain is evinced, and the crack has become complicated by extending into the sensitive tissues. Horse with quarter-crack never "harps" (The term "harping" is used to express the quick flinching movement of the foot the instant it touches the ground, so characteristic of toe-crack. The animal's weight spreads the heels, closes the toe-crack and pinches cruelly the protruding sensitive laminal tissue. The animal's attempt to lessen his pain by carrying the affected member free of the ground, or very much shortening the duration of contact causes this peculiar hopping gait known as "harping"), for the weight of the body spreads the heels, opens the crack and relieves the podophyllous tissue that is pinched when the weight is taken from the foot and the crack closes. Air and dirt entering the crack increase the inflammation, and suppuration may result. The pus will dissect the podophyllous from the keraphyllous tissue and finally escape between the hair and the coronary band. In high-heeled horses the macerating influence of the pus may establish a necrosis of any or all surrounding tissues. Suppurative arthritis is not an uncommon sequel.

DIAGNOSIS:-- Easy. The rational symptoms point to the injury and the local symptoms confirm them. Consider carefully the extent and gravity of the crack which, when lameness and discharge are absent is only in the horn; when lameness is present, but no pus nor isochronous movement has probably penetrated the podophyllous tissue; when lameness and isochronous movements co-exist has caused pus formation. Don't be deceived by a sudden disappearance of the pain; apparent convalescence may be but a prelude to a more serious condition. Necrosis of a digital nerve will act as a neurotomy and diminish the pain. This condition very unfavorable.

PROGNOSIS:-- Serious from likely complications and the predisposition to subsequent attacks. Three months usually required to cure an ordinary quarter-crack. "Toe-cracks are the worst, but quarter-crack are very much the worst."

TREATMENT is Preventive and Curative.

I. PREVENTIVE TREATMENT, is the best and consists,

- 1st. In maintaining a normal softness and pliability of the horn by a judicious use of the foot bath and hoof ointments.
- 2nd. In protecting the horn from the ravages of the hoof knife and rasp.

3rd. In obtaining such a perfect coaptation of hoof and shoe that equal pressure upon the latter is everywhere exerted. Quarter-crack is usually accompanied by defective horn, low empty heels, or by abnormally contracted heels. The horn must either yield to internal pressure or break; if it is dry and brittle, or scant in quantity as in very low heels, or drawn closely about a contracted heel, its tendency is to crack under the expansive force of the heels, when the weight of the body is thrown upon the foot. Never allow the hoof-knife to thin the bars, open up the heels, thin the sole too much, or cut away the frog. Don't rasp the wall above the clinches, the perioplic varnish keeps the wall from drying out. Allow the heels to rest rather loosely upon the shoe. For contracted heels use a bar-shoe, this will give pressure on the frog and prevent further contraction, even if it does not ultimately spread the heels. A Defays shoe is good.

II. CURATIVE TREATMENT:- Varies with the gravity of the crack.

(a) If the crack is incomplete and not deep, and has not suppurated, rest the animal, remove the shoe, thin the horn, and either apply a flax-seed or bran poultice, or a wet sponge or stand the animal in water to the fetlocks. This may cure in a few days, then a Defays' shoe may be used.

(b) If pus is present, allow it to escape; thin the horn and apply a poultice which should be kept constantly wet with cold water, and a cure may often result without recourse to an operation; tho' there may arise such complications as cartilaginous quittor, necroses of all structures in the foot, pyaemia, etc. and eventually cause death.

(c) If the crack is formidable some of the following methods may be tried:-

- 1st. A circular iron band ligature, a treatment once in repute, now in-disuse.
- 2nd. Pinning the crack shut is difficult because of having to make each nail describe an arc of a circle.
- 3rd. Vachette's hooks may be used on thick-walled feet, as for toe-crack. Usually there is danger of carrying their points into the soft tissues.
- 4th. Apply a bar shoe. Cut down the wall of the heels till the frog rests upon the bar of the shoe. Usually the frog of a foot afflicted with quarter-crack is so small that a bar shoe will not give any good results.
- 5th. A Defays' shoe may be used at the commencement of the disease, before there is any inflammation of the soft tissues. (For description of Defay's shoe see page).

To dress the foot, thin the sole and wall, but not the bars, apply cold moist dressings, and have the animal exercised gently each day. Keep poulticing till the lameness disappears, then shoe as above.

In aggravated cases where suppuration is established pare out a triangular space at the top of the fissure so that the fissure shall pass upwards through the apex of the triangle and bisect its base. From the bottom of this "V shaped" space remove all necrosed tissue.

If the processigerum reticulum be necrosed, scrape the basilar and retrorsal processes, being careful not to injure the lateral cartilages or lateral ligaments, or a suppurative arthritis may result. Apply an antiseptic and stimulating wash, pack evenly and tightly with aseptic oakum in carbolized oil, and bandage tightly and evenly. The animal will be very lame for a few days, and in much pain. Give rest, at least the gait must be slow. The lameness will gradually disappear, and when all gone, or nearly so, remove the dressing and apply hoof ointment. New growth of horn may be hastened by firing or blistering the coronary band. Gentle exercise once a day when getting nearly well. In shoeing, if the heels and frog are so poorly developed that a bar shoe seems unsuited, frog pressure may yet be obtained by placing a piece of India-rubber between the frog and bar of the shoe.- Zuill does not think much of this. A seam of the heel is treated in the same way.

K E R A P H Y L L O C E L E .

A KERAPHYLLOCELE is a horny tumor on the internal surface of the wall of the hoof caused by a hypersecretion from the podophylloous tissue. A horny tumor between the sole and keratogenous membrane caused by a hypersecretion from the latter is called a "Keratocoele". Keraphyllocele is a common sequence of toe or quarter-cracks. Examine the sole of a foot having such a tumor and it will be seen that the white line does not follow at an equal distance from the wall at every point; where it crosses the crack it dips in toward the edge of the sole and presses upon the laminal. Such a tumor will often grow down and disappear after the crack which caused it has been obliterated.

ETIOLOGY:- Keraphyllocele may be caused by a crack in the wall, may follow laminitis or supervene upon severe operations on the wall. A nail driven close to the sensitive tissues, by pressing the soft horn back against the podophylloous tissue and producing continuous irritation, will cause a hypersecretion of keraphylloous horn. (keraphyllocele). The contusion produced by hammering a clip too closely against the toe is an alleged cause.

SYMPTOMS; are,

I. Rational or General.

II. Objective or Local.

I. RATIONAL SYMPTOMS, the chief of which is lameness, are first observed by the groom or owner, though the local symptoms exist much earlier. As the tumor enlarges it presses upon the laminal and processigerum reticulum, diminishes their blood supply, and causes them to atrophy. So long as the atrophy is rapid enough to accommodate the enlarging tumor the internal pressure is about normal, there is but little pain and no lameness. But if the tumor growth exceed the rate of atrophy, or if pus be formed, internal pressure is much increased, intense pain is produced- often accompanied by isochronous movements, and lameness of varying degrees appears. The exciting cause may have been a previous crack.

II. LOCAL SYMPTOMS:- When the pressure of tumor or pus is so great as to produce lameness, it may also cause the bone to necrose where it is pressed upon by the tumor, Usually, however, the bone is slowly absorbed under the tumor; the processigerum

reticulum continuing to atrophy, but secreting horn to the last, dips down into the deepening groove in the surface of the third phalanx. This pathological groove may so weaken the bone that violent effort may produce an antero-posterior fracture. One such case has been recorded at the Alfort School. A normal foot may have a shallow notch in the toe of the os pedis on the median line, and the white line will dip into this sinus. Percussion on the wall over the tumor gives great pain. The wall may yield under pressure from the tumor, and become abnormally prominent at that point, in which case the wall will appear pushed out at the toe and concave from above to below. There will be found on removing the shoe either an abrupt flexion of the white line indicating a keraphyllocele, or a point of hypersensitiveness which is the point of greatest pressure. Pressure here gives great pain. The horn may be infiltrated with a serous liquid, be soft and easily cut, and when cut reveals a blackish exudate mixed with pus. Heat may be observed.

ANATOMICAL ALTERATIONS:- The tumor has usually a conical or wedge shape, apex toward the coronary band. At its upper part we can still find atrophied laminae, while at its lower portion they may be entirely wanting. The tumor is soft, and a cross-section shows that it is channeled longitudinally by dry fistulous tracts formed by an intermittent arrest of the secretion of horn by the laminae. These channels may extend from the coronary band to the sole. This tumor may be loosely adherent to the wall, united to the wall at the sole and not higher up, or entirely free from the wall at all points. No matter how atrophied the lamellae are, they continue to secrete horn till their death, in fact, they secrete horn faster in disease than in health. The processigerum reticulum has greater vitality than the bone and is never entirely absorbed, tho' it may be destroyed by necrosis.

DIAGNOSIS:- Easy. The lameness, designated "shoulder lameness" by the owner, simulates the "pegged shoulder" gait of navicular disease. Corns and contracted heels may cause a similar gait. Suffering may prevent the placing of the foot upon the ground. Examination of the foot usually reveals the disease. Axiom:- "When a horse is lame in the shoulder, examine his foot."

PROGNOSIS:- Serious. Requires surgical interference.

TREATMENT:- Remove a section of the wall and the tumor. "Stripping", though very painful, and difficult to treat after the operation, may give the best results when complications exist. When there are no complications "thinning" is to be preferred.

OPERATION:- Cut a narrow groove on each side of the tumor, from coronet to sole, reaching down to the podophylloous tissue. With hoof knife or sage knife separate sole and wall along the white line. If stripping be chosen, seize the strip of horn in the pincers and make slow torsion, being careful to preserve the coronary band from injury by exerting thumb pressure upon it. If thinning be adopted, proceed as in toe-crack operation and remove the tumor. In either case remove all horn that has been macerated loose, all necrosed tissue and dress as a toe-crack.

KERATOCELE.

This is a horn tumor secreted by the velvety tissue of the sole, and is produced by the same causes that lead to keraphyllocele. May exist and cause no lameness. Velvety tissue not easily bruised, and so contusions of the sole less likely to produce this tumor than contusions of the wall are to produce keraphyllocele. Most frequent in low, flat-footed animals.

SYMPTOMS:- Rational and Objective.

I. RATIONAL SYMPTOMS:- Lameness at first irregularly intermittent- as in acute navicular disease, becomes ultimately continuous and intense.

II. OBJECTIVE SYMPTOMS:- Remove the shoe and explore the foot. Make pressure, and at a certain point deeper than the nail-holes pressure will cause much pain. Pare down the sole, and if the tumor is recent we find a bruise or corn, but if the tumor is old we find a circle of blood-soaked horn about a central dry hard spot. Thin this central spot and quite a cavity is produced, or opened to view. Several such tumors may exist on the same sole.

ANATOMICAL LESIONS:- Atrophy of velvety tissue, plantar cushion, plantar aponeurosis, or even of the os pedis.

DIAGNOSIS:- Not difficult. Intermittent lameness (in early stages caused by accidental pressings upon the tumor); local manifestations, and pressure by the pincers indicate the lesion.

PROGNOSIS:- Serious. Always necessary to unsole the foot, for there may be several tumors. The horse will recover as soon from this operation as he will if only a portion of the sole is removed. Bouley says, the disease may return if the entire sole is not removed. Horn piles up so rapidly on the sole that the horse can be shod and worked in two weeks after the operation.

TREATMENT:- Unsole, and remove all atrophied or necrosed tissue. The space from which the atrophied tissue is curetted soon fills with granulation tissue that secretes as good horn as did the original velvety tissue. Dress as far "penetrating street nail" and allow it to remain on from seven to ten days.

PRICKING AND NAILING.

In shoeing, a nail may leave the hard horn and enter the sensitive tissues; if instantly withdrawn we designate it "pricking". If, however, the nail is driven home, drawn up, and clinched we have "nailing". Nailing may cause keraphyllocele. Both are of common occurrence.

ÆTIOLOGY:- Predisposing and Determining.

I. PREDISPOSING CAUSES:-

1. Thin-walled and soled feet.
2. Hard-walled feet. Thin-walled feet dry out quickly and become hard and brittle on the outside and often turn a nail inward.
3. Contracted feet have walls that are perpendicular or even turned inward, and are difficult to nail with safety. When the walls are thick and slanting, the soles thick, or the toes long there is little danger. English farriers pare the wall less than we do, and thus seldom prick the foot. (Gems by the Wayside.

A long toe increases the stride, but also increases the strain upon the flexor tendons. One pound on the back of a runner is equal to one yard handicap in one mile.~ Gloucester).

II. DETERMINING CAUSES:-

1. A nail may give off a flaw (split) and prick the sensitive tissues. The Putnam nail is the one most likely to split.
2. A nail may be deflected inward from its proper course by the stump of an old nail.
3. Unskilful driving- more horses pricked on Monday morning than any other time (the effect of a Sunday "celebration"). Sore footed horses flinch and are restless under the farrier's hammer, and to avoid trouble and delay the smith often drives the nails "home" with one or two heavy blows. In this way pricking and "close" driving often happen, and the latter goes unnoticed because the sore footed horse flinches under every stroke of the hammer.

The sound of the nail under the hammer is a pretty good guide; a nail in sound horn gives forth a resonant sound, in soft horn a dull sound. Drive all nails slowly with gentle taps- beveled side inward.

SYMPTOMS:- Rational and Objective.

- I. RATIONAL SYMPTOMS:- Continued and increasing lameness, and often isochronous movements.
- II. OBJECTIVE SYMPTOMS:- Change of sound when the offending nail is struck. Animal flinches and withdraws the foot. The clinch of the offending nail is usually higher up the wall than the others. Pressure with the pincers gives pain. Removing the shoe causes pain. When the nail is withdrawn blood or pus may be found on its point. Thin the sole at this point till it bleeds. The yellow zone will appear thickened, more yellow and softer and may have liquid beneath it. This liquid is of a blackish color due to broken down horn cells, later becomes lighter from admixture with laudable pus, and still later of a wine color from admixture with blood. Pus may be produced in such amount as to separate the keraphyllous from the podophyllous laminae from the prick downward to the angle of wall and sole, thence upward to the coronet where it forms a soft prominence and bursts out upon the surface.

DIAGNOSIS:- Easy. Lameness progressive in severity. Examination of the foot as explained reveals the condition.

PROGNOSIS:- Serious if suppuration has begun. Improper treatment may invite serious complications. The character of the discharge aids in the prognosis; a thin, fatty, wine-colored discharge is most unfavorable; laudable pus favorable; and a dark colored discharge more favorable. The animal cannot be used while under treatment. Wine-colored discharge usually indicates a phlebitis, or a gangrene.

ANATOMICAL ALTERATIONS; may be anything from simple inflammation to gangrene of the entire foot. Examine the nail, if black it has been oxidized in the soft tissues. Blood, black liquid, or pus may flow from the nail hole. Pus denotes necrosis.

TREATMENT:- If, after a prick, the animal is rested and cold fomentations applied, a cure usually results. Farriers often pour hydrochloric acid, or Ammonium Chloride into a prick, but this only ag-

gravates the case. Never replace the pricking nail nor the ones on each side. It is good treatment in case lameness arises from a prick or close nail, to thin the sole to the blood over an extent of one-fourth or more of its surface, it does no harm and lessens pressure from internal inflammation. Don't nick the velvety tissue. A blackish exudate from the thinned horn indicates that suppuration has not begun. Apply any antiphlogistic treatment (water, flaxseed poultice, etc.,) and recovery soon follows.

If pus be found, granulation tissue has formed; then not only thin the sole, but thin a triangular section of the wall- apex at the seat of disease, and base at lower edge of the wall. Don't be deceived by finding healthy tissue under the wall. Pus may exist underneath a healthy processigerum. Incise it and look for pus and necrosis beneath. Curette away all necrosed tissue, and scrape the bone till blood oozes from the cancellated tissue. If much pus has formed and broken into the hair it may be necessary to remove an entire quarter and even the basilar and retrorsal processes. Do not injure the lateral cartilages. Zuill prefers not to strip away the horn, but to leave it to act as a compress. Extirpation of the wall is not indicated unless you are absolutely certain of necrosis of some tissue; then use your judgment as to whether you should "thin" or "strip". Apply a stimulating and antiseptic wash; an oil dressing to the raw surface to keep the horn soft, and a compress bandage. Quittor dressing is good. Inject carbolized water each day into the dressing to wash out the pus. Suppuration will cease in four or five days, and then nothing need be done till the dressing is removed at the end of from fourteen to eighteen days.

B U R N T S O L E .

An inflammation of the velvety tissue resulting from the application of hot shoes. Shoes should be heated, but not hot when applied to the foot. The irritation is in direct proportion to the heat of the shoe, its mass, and the thinness of the sole. Large flatfooted working horses have not generally as thick hoofs as the ordinary driving horse.

SYMPTOMS vary according to the severity of the burn; may have the symptoms of all the inflammatory phenomena from simple congestion to suppuration. The first lameness is usually noticed the day following the burn, perhaps several days after, and is caused by the compression of the inflamed velvety tissue of the sole. The hot iron removes the moisture from the horn, leaving it hard, brittle and porous. The serous exudate from the inflamed velvety tissue is imbibed by this porous horn, as a sponge takes up water. The sole now becomes moist and easy to cut. The moisture is not in the cells, but about them- this is pathognomonic of burnt sole. Inflammatory phenomena may continue till pus is formed.

DIAGNOSIS:- More or less intense lameness. Pressure with the pincers reveals an exaggerated sensitiveness over the whole sole. The character of the horn may betray the cause.

PROGNOSIS:- Serious, because clinical experience has proved that the animal may continue lame a long time, a year or more- after every tissue of the foot appears to be perfectly normal.

"A very slight burning may cause a lameness of two or three months.

TREATMENT:- Remove the shoe and thin the horn to the very bottom; do not unsole. Apply a cold wet dressing, poultice, sponge, oakum or better, - peat moss. The dressing may be wet with "White Lotion." If pus be present, strip the entire sole, and apply a compress dressing of oakum and carbolized oil. Press firmly, and bandage evenly and tightly. Should there be any necrosed tissue, remove it, whether much or little. If necessary, perform the full operation for "Penetrating Street-nail." Bouley says, "Long continuation of the lameness may be due either to a hyper-sensitiveness of the velvety tissue, or to a painful cicatrix."

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Chapter III.

Q U I T T O R .

QUITTOR:- A word of uncertain etymology used to designate a necrosis, mortification or decay of any of the tissues of the anatomical foot of solipeds or bovines. Quittors are of three kinds:-

- I. Cutaneous quittor.
- II. Tendinous "
- III. Cartilagenous"

CUTANEOUS QUITTOR:- Any small, or limited sloughing or ulceration of the skin and sub-cutaneous connect. tissue below the carpus or tarsus. When extensive it is called a "slough." Vatel first noticed it to be an exaggerated inflam. of the whole thickness of skin, extending from the subcutaneous connect. tissue outwards. Hence abrasions and erythematous conditions, being altogether superficial, are not quittors.

ETIOLOGY:- Bruises due to slipping on slippery pavements, and to interfering on muddy roads. Canal horses quite subject, especially toward latter part of winter. Commonly called "Mud Fever" or "Erythema." Horses with clipped legs, especially when exposed to melting snow mixed with sand or salt, as often happens in the city, are liable to this affection, by reason of the irritation produced by sharp particles of flint passing through the skin in the fold of the fetlock. This lesion is serious, because the extremities are rich in connect. tissue, and poor in vitality; so inflam. develops and recovery comes slowly.

SYMPTOMS:- Obscure.

1. Acute hypersensitiveness of region.
2. Some swelling. (not constant).
3. Slight elevation of temperature.
4. Tissue bright red.
5. "Stiffness" of gait, rather than lameness.

Important to early discriminate between cutaneous quittor and deep abscess. If the latter is suspected make deep incisions through the skin. In either case they do good; for local bleeding is good for a cutaneous quittor, and if pus has or is about to form it can then escape, otherwise it remains to involve deeper structures.

The first indication of gangrene is a loss of heat of a small area of skin; the hair now stands on end, and becomes moist and "soapy" to the feel by reason of an exudation of serum through the numerous minute cracks which surround the patch of dying skin. The cracks grow to be fissures, coalesce, deepen and the slough is slowly eliminated. Not infrequently it happens that the slough is never complete, but continues to be attached by fibrous bands to bone or cartilage, finally causing necrosis of these parts, and thus a tendinous, cartilaginous or bony quittor follows. A dark blood stained pus is produced by the granulation tissue which springs from the border of the living tissue and fills the fissures. The living tissue is warm and dry while the patch of dying skin is moist, soapy and of lower temperature. When the slough comes away, these granulations occupy its place and rise to the level of the skin. The cicatrix which follows looks like true skin, but contains neither sweat glands, sebaceous glands, hair follicles, nor pigment cells, and is really only a thin epithelial covering. In the fold of the fetlock these cicatrices may form callous wounds.

DIAGNOSIS:- Early, obscure; late, easy. At first difficult to differentiate between deep and superficial abscess. Treat both alike.

TREATMENT:-

1. Local bleeding to unload engorged vessels and form an exit for pus.
2. Poultices to favor elimination of slough. Make the emollient dressing antiseptic with carbolic acid or other germicide to prevent microorganisms from gaining entrance to the lymph channels in the fissures, should a slough develop. On removal of the poultice wash the region thoroughly with carbolized water, and apply a light carbolized oil dressing with considerable pressure, and continue it till complete healing has taken place. The oil maintains softness and pliancy of the skin; the pressure greatly hastens healing of the granulations, and also keeps the limb quiet; a prime consideration when the fold of the pastern is involved, for motion here will result in a bad callous wound. If granulations rise above the edge of the skin, curette them away and then dress.

The essentials are the antiseptic poultice, oil dressing, pressure, quiet.

QUITTOR OF CORONARY BAND:- A variety of cutaneous quittor, developed in cuticular region and embracing this in the slough.

ETIOLOGY:- Any traumatic injury to the coronary band. Heavy, clumsy horses working on slippery roads; or knocked from side to side between the shafts of heavily laden carts and stone wagons; pole horses; cattle turned in among corn stubble or into rough pastures, etc., are all liable to bruise the coronary band and cause this disease. Some horses habitually rest the heels of one hind shoe upon the toe of the other foot and may bruise or calk themselves. The itching produced by parasites on the skin of the legs of un-groomed horses will often cause rubbing and bruising of coronary band. In cattle this form of quittor is not so serious as in horse, because the hoofs of cattle expand somewhat and accommodate the inflam. In them coronary quittor may become sub-acute or chronic, rarely complicated.

SYMPTOMS:- Those of cutaneous quittor precisely, except that pain is continuous and intense owing to the compression of nerve endings in the inflamed coronary band by the upper border of the wall of the hoof. Intense pain from even the smallest wound, so that the foot may be held free of the ground. Under increasing inflam. the perioplic band becomes soft and whitish from an infiltration with serum and pus. The intensity of the pain and the great loss of tissue, which may be a complication, constitute its chief gravity.

TREATMENT:- To relieve pain, thin the horn over a crescent-shaped area of the wall in advance of the slough, so as to completely relieve the pressure upon the swollen coronary band. By this procedure pain is abated, and tissue waste reduced. Slough in this region results seriously. Surgeon usually called in time to operate and prevent sloughing, because intense pain from the beginning causes an early lameness. As in cutaneous quittor, apply a poultice of bran, cornmeal, moss, etc., containing such a germicide as Potass. Permang., Carbolic acid, Corrosive sublimate, Chlorine, Bromine or Iodine to destroy all germs; in absence of antiseptics heat the poultice to boiling point. Afterwards cleanse and apply an oil dressing under pressure to maintain softness of horn and keep down exuberant granulations. Use a quittor or a toe-crack dressing according to location. If treated as an open wound, granulations will pile up and intense lameness continue.

With such treatment this quittor is not grave. On healing it always leaves a cicatrix in the horn of the wall which looks like an old toe or quarter crack. The cicatrix, however, is not an open fissure, and does not impair the strength of the wall; it is merely an eyesore.

C A R T I L A G I N O U S Q U I T T O R .

May arise from cutaneous quittor, is persistent and tenacious, and may require the animal's destruction. For a detailed description of the "Fibro-cartilages of the Pedal Bone" see page 2.

ETIOLOGY:- 1. Traumatisms-- blows, kicks, "forging," interfering; common in cities among heavy horses working upon rough, slippery pavements. Faulty shoeing is a prolific cause.

2. A sequela of cutaneous quittor, superficial abscess, suppurating corn, penetrating street nail, quarter-crack,

SYMPTOMS:- Vary with the extent and intensity of the disease, and the age, race and temperament of the animal.

I. Rational symptoms:- 1. Pain, often intense, is produced by the constriction of the swollen and sensitive podophylous laminae and coronary band by the inextensible horny box, increased often by accumulation of pus and blood under the coronary band, whence it cannot escape save through formation of fistulous openings in the skin.

2. Lameness due to pain, and much increased by such complications as corns, street-nail, quarter-crack, etc. Lymphatic horses less lame than thoroughbreds.

II. Local symptoms:-

Swelling marked about coronary band, and has the effect of causing the hoof to appear shrunken.

Discharge of pus from fistulous openings. Pus may be stained with blood from granulations which line sides of fistulous tracts and spring from sound tissue about necrosing sequestrum of cartilage. The opening of a fistulous tract upon the skin is in the centre of a button of large, flabby, reddish or bluish exuberant granulations which bleed at the slightest touch. From this opening comes a profuse discharge, out of all proportion to the apparent size of the wound- of thin, offensive smelling pus (ichorous) indicating of itself the presence of a fistula leading to a cartilaginous or tendinous quittor. As the disease ages, the pus continues to be ichorous, the tract deepens and its walls become indurated by formation about them of connective tissue. This connective tissue may become adherent to under surface of the skin, so that the tracts may be felt through the skin as hardened, resisting cords. The tracts may be single or branched. A probe introduced gives to the hand a "gritting" sensation when it meets cartilage, but a sensation such as would be given by a soapy rag indicates either badly necrosed cartilage or tendon. The formation of fibrous tissue about the fistulous tracts continues till a stricture is produced which prevents the exit of pus, which then accumulates anterior to the tract and finally bursts through the skin at the coronary band. The new opening is at first ragged, but soon assumes the characteristic granulated and later indurated appearance of a true fistulous opening. This process continues from behind to before, in the direction in which the cartilage necroses, till in an old case a line of cicatrices which are the closed mouths of old fistulous openings appear posterior to the one or two openings which have last formed, and which are alone discharging. The necrosing cartilage is unable to limit the process by the formation of a sequestrum, and its final discharge followed by cicatrization; but the diseased patch of cartilage is always attached to the sound cartilage anterior to it. If unchecked, the necrosis finally attacks the lateral ligaments of the second interphalangeal articulation, and sets up Suppurative Arthritis; it may even reach the anterior extensor of the phalanges, lead to tendinous quittor, synovitis, necrosis of bones of foot, and loss of the foot. Necrosis of any or all structures of the foot may follow this quittor.

If the necrosis is due to a corn, the quittor first appears at the coronary band near the heel. The more anterior it becomes the more dangerous does it become, and when it has advanced to the middle of the cartilage an operation should be resorted to. Frequently, as a result of a corn a characteristic fistulous opening appears on the sole where the corn existed, hence usually in the angle made by the "bars" and wall of the "quarters". In this case if the basilar process be necrosed remove it, and the cartilage may not be involved. Usually, however, necrosis of bone at this point also involves the cartilage. If basilar process comes away, the lateral ligaments are usually compromised, and suppurative arthritis, suppurative phlebitis, etc., ensue in rapid succession.

DIAGNOSIS:- Difficult only in early stages, especially when a complication of Cutaneous quittor. The swelling of the coronet, fistulous openings, pus, pain, lameness and induration are diagnostic points.

PROGNOSIS:- Must be guarded. Examine carefully with a probe and ascertain whether the necrosis is in the anterior, median, or posterior third of the cartilage. Necrosis of the first two are equally dangerous and an operation should be performed immediately or the disease may result fatally; necrosis of posterior third may be indulged in an effort to check without an operation. A granulating ulcer may be distinguished from the opening of a fistulous tract by the probe, the excessive discharge from the latter, and the fact that an oil dressing under pressure of a roller bandage will not check the formation of exuberant granulations of the fistula as it does upon an ulcer. The only danger of an operation is of opening the articulation.

ANATOMICAL AND HISTOLOGICAL ALTERATIONS:- A thickened, indurated skin, adherent to the lateral cartilage and showing cicatrices of old fistulous openings, or the pale or reddened flabby granulations of new ones; profuse discharge of ichorous pus from the exuberant granulations which line the fistulous tract and surround the tongue of necrotic cartilage; the tongue of cartilage always attached anteriorly, and of a dark green or a yellowish green respectively as cartilage or fibrous tissue predominates. The coloring matter is that of the blood which has undergone degenerative changes. It is soluble in alcohol. Necrotic cartilage is greenish; necrotic tendon is yellowish green. The alterations depend much on the cause and location of the quittor.

What causes the cartilage to necrose, and why cannot the necrosis limit itself? The cartilage cells are nourished by imbibition of the protoplasmic substance about them. Each cell contains one distinct nucleus, and several cells are contained within one capsule. These cells have little vitality, and a slight irritation produces those changes in the cell which we know as inflammation. The cell becomes as we say "vitalized;" that is, its protoplasm increases in amount, the nucleus divides again and again, and several cells are formed within the capsule of the original cell. The nourishment that fed one cell is now insufficient for several and they die, and the necrotic process has begun. The dead cells are now foreign bodies, and act as irritants to the living cells near them, thus the necrotic process is indefinitely continued in the direction in which the cartilage cells are most numerous, viz:- towards the anterior extremity of the lateral cartilage.

TREATMENT:-

THREE METHODS. { I. Surgical Operation.
 { II. Actual Caution.
 { III. Potential Caution.

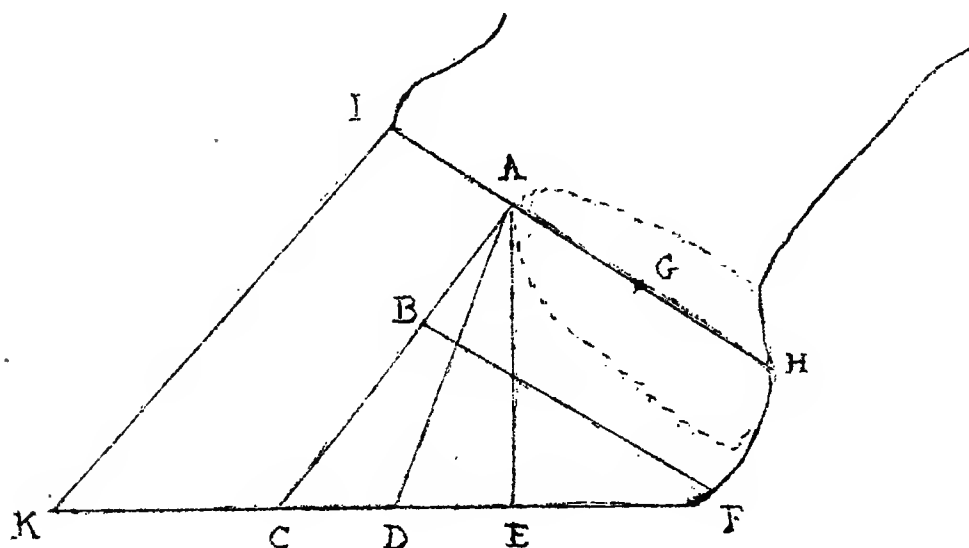
I. SURGICAL OPERATION:- This, the usual method, and is indicated when necrosis of lateral ligaments and opening of the articular bursa is threatened. The first operation was done by Lafosse, Sr. in 1754. He used the "extirpation" method, now in disuse. Another method was to remove the cartilage through an incision above and parallel to coronary band; but the difficulty of removing all of the cartilage, and the accumulation of pus in the wound which had no dependent opening, gave rise so frequently to serious complications that it has been discontinued. Surgeons are now agreed that the entire cartilage should be removed, and that more or less of the wall of the quarters should be either stripped or thinned.

Renault's operation is the one in general use.

RENAULT'S OPERATION:- Remove the shoe and soften the hoof by poultices or foot-bath till it can easily be cut with a hoof knife. Trim the foot and fit to it a quitter shoe, making the nail holes, but not nailing it on. On the day before the operation some horn may be removed from the area to be designated later. Prepare the horse for an operation by feeding lightly for 12 hours previous.

When all is ready cast the animal and secure the cannon of the diseased foot above the hock of the hind leg of the same side when the quitter is external; of the opposite side when the quitter is internal. In either case the diseased cartilage will be uppermost, and the fetlock unencumbered with fastenings. With curved scissors clip hair from region of operation. With a large hoof knife cut a groove in the wall from anterior extremity of lateral cartilage to plantar border. This groove should meet the plantar border of the wall at a right angle, thus crossing the horn tubes. This method has for its purpose the removal of enough wall to allow the easy removal of the whole cartilage with the preservation of the greatest possible base support for the foot.

Surgeons agree that the groove should begin at that point of the coronet which marks the anterior extremity of the lateral cartilage, but differ as to the direction of this groove, as indicated below.



Lafosse, Sr. made the groove Ac. parallel to I.K.

Lafosse, Jr. " " " A.B.F.

Rey " " " A.D. so that D.F. equals A.H.

Renault " " " A.E. perpendicular to K. F., so that E.F. about equals one third of I.H. (I.A., A.G. or G.H.).

The dotted line indicates outline of lateral cartilage.

Following Renault's complete operation we make the groove A.E. about 4 m.m. (1/6 inch.) in width down to sensitive tissue, but not injuring either velvety tissue of coronary band or the podophyllous laminae. Thin the horn over the space A.E.F.H. and also the "bar", and portion of the sole between the bar and E.F. till

till as thin as paper, and can be readily cut through with the knife. Use greatest care not to nick the podophyllous laminae or coronary band, cutting always downwards and forwards against thicker horn.

When the wall, coronary band, sole and bars are everywhere equally thin, soft and yielding to pressure, the coronary band may be lifted. Apply a tourniquet to the limb to lessen bleeding. With a sage knife in the full hand, and the thumb pressed against the sole near the "white line" to cause the hand to move with foot and not to cut the coronary band should the animal struggle, insert the knife's point at the intersection of the groove with the inferior border of the coronary band and prolong the incision around the heel and about 1/2 inch ~~xxx~~ along the bar, following the white zone which lies between the coronary cushion and the podophyllous laminae. Cut just deep enough to pass through the thinned horn. Again follow this incision, inserting the knife deeply under the coronary band with its cutting edge turned so as to cut as near the external surface of the lateral cartilage as possible. The fingers of the other hand placed on the skin warn the operator should the point of the knife approach too near the skin. The coronary band may be lifted upon a retractor and carefully dissected from the cartilage, but a skilful operator makes this separation by one or two slow and steady backward sweeps of the knife, carrying it well around the glome of the heel into the lateral lacuna, and being careful not to nick the band in making the turn.

The cartilage is now to be removed. Insert the sage knife and carry the blade back till the heel of the knife is in the flexure of the coronary band at the heel of the foot, the knife pointing upward and forward. Rotate the knife on its long axis so that its cutting edge turns inward parallel and close to the superior border of the cartilage. When the knife has made 1/2 turn and its edge is downward and close to the inner surface of the cartilage, then fix the heel of the knife and describe an arc of a circle with its point bringing it out through the cartilage at the lower edge of coronary band. This procedure removes the posterior third of the cartilage. Do not cut through the fibrous membrane underlying the cartilage, or suppurative complications serious in nature may ensue. To remove remainder of cartilage raise coronary band on a retractor and with a fine hoof knife shave the cartilage upwards and backwards till it has almost entirely disappeared and only the thick fibrous membrane remains. This membrane is attached below and forwards, but is loose above and behind, so that upward and backward strokes render it tense and smooth, and diminish the danger of cutting through it; while downward strokes wrinkle it and increase this danger. When working on the cartilage over the lateral ligaments, use great care not to open the articular bursa which underlies the basement membrane between these ligaments. Finally, but two patches of cartilage will be left:- one high up near the extensor tendon, and the other along superior border of wing of pedal bone. Remove the former with forceps and scissors, or its subsequent suppuration will involve the tendon and result disastrously; remove the latter with small hoof knife, even scraping the pedal bone, though a little cartilage here is not very

dangerous, it simply prolonging suppuration. Wherever the laminae are nicked, granulations afterward appear, and healing is retarded.

If the wall be removed by stripping (a barbarous practice), the hints given under "toe-crack" on page 21 can be applied to this region.

DRESSING:- Of equal importance with the operation. Nail on the quittorshoe, and leave the second nail from the toe, on the opposite side, to be bent down as a hook to hold bandage. Wash the wound and foot with an antiseptic, dry it, and pack small balls of sterilized oakum soaked in carbolized oil with even pressure up under the coronary band till you think the pressure of the dressing that you intend to place on the outside will be just about sufficient to bring the coronet to its normal position. Should too little oakum be placed under it, the pressure of the later dressing will force the lower edge of the coronary band down upon the podophyllous laminae where it will adhere and prevent the pus which forms under the coronary band from escaping. This adhesion will have to be broken, and healing will be retarded. Pack these little oil-soaked balls over the area of thinned wall and sole, and cover with small oakum pads, also soaked in oil. The oil maintains the softness and pliancy of the horn. Follow with larger dry pads extending from heel to toe and from the shoe to middle of the fetlock. Better too much than too little oakum.

The bandage should be of "ticking," or material of equal strength, about $1\frac{1}{8}$ inch wide and from 9-12 yards long, rolled into 3 rolls. Grasp the bandage one foot from the end, and holding this hand at the heel, carry the bandage first tightly over the middle of the oakum, around the toe, under the nail and back to the heel where it is tied in a half-knot with the end. Let an assistant hold this end; carry the bandage next about the top of the oakum, under the nail, around the heels between the end held by the assistant and the shoe; the third turn is taken around the bottom of the oakum. The fourth and all subsequent turns are about the bottom, each overlapping the preceding by $\frac{2}{3}$, and all passing under the nail and below the end at the heel. Tighten each turn from heel to toe by pressing with the ball of the thumb. When the turns reach the upper border of the oakum, carry the bandage to the bottom and repeat. Finally tie the two ends at the heel, pass the second end upward between the heel and the turns of bandage and tie again to the first end. In this manner all the turns are kept in one strand and prevented from slipping up into the fold of the pastern. The overlapping turns resemble shingles, and the down-turned edges are least apt to be caught and disarranged by the shoe of the other foot.

Pack plenty of oakum in between the frog and heel of the shoe. Trim off excess of oakum, paint tar over the bandage, and let the animal rise.

This dressing should be left on as long as possible, for every time it is removed healing is retarded from 24-36 hours. In 4-5 days pus usually appears at surface of the dressing, in which case, if pulse and temperature are about normal, inject Creolin or Carbolyzed water into the dressing from a syringe, and wait 8-10 days longer.

In the meantime if there is much pain, or a rise in temperature, renew the dressing. At end of the second week remove the dressing, and all the oakum from under the band. Do the latter carefully so as not to break granulations and cause bleeding. Dress again, and in 5 weeks from operation the animal may work, but a longer rest is better. Horn will grow from coronet to sole in about 8 months.

COMPLICATIONS:- 1. Necrosis of cartilage not removed. Remove dressing, examine foot, curette away necrosed tissue and reapply the dressing.

2. Necrosis of anterior and posterior lateral ligaments. Remove dressing, and apply continuous irrigation, the only chance of saving the animal's life. Nocard and Trasbeau have noted recoveries after such a complication. When necrosis has ceased, reapply dressing.

II. ACTUAL CAUTERY:- yields fair results when the necrosis is limited to the fibrous tissue of the posterior part of the cartilage. Solleysel applied a line of fire along the coronet, over the tumor, down to the cartilage itself; but any complication was liable to follow. Renault opened the fistulous tracts, and cauterized them and the necrosed part. He then applied poultices till the slough was eliminated. The results are not encouraging.

III. POTENTIAL CAUTERY:- possesses the advantages of actual cautery, without its baneful effects. Corrosive Sublimate used by Solleysel, is the best. The powdered salt is carried to bottom of the tracts where it dissolves, renders the slough antiseptic and hence almost nonirritant to the living tissues. The salt in powdered form may be introduced on a moistened probe, or in little pellets of cotton or oakum. The action of the salt is uncertain aside from its antiseptic power. It is supposed to modify nutrition of inflamed tissue in some way. It certainly does arrest necrosis, and allow the sequestrum of cartilage to loosen from its anterior pedicle and be discharged. Granulations take its place.

Arsenious Acid (As_2O_3) in pill form, with Gum Arabic, has been used in fistulous tracts, but as it is directly escharotic to living tissue, it often produces enormous sloughs, and has poisoned by being absorbed.

Sulphates of zinc, copper and iron, both in powder and in solution, have been used in England, with good results where the necrosis was quite posterior.

Villate's Solution, introduced in 1847 and adopted in 1851, is useful in treatment of all fistulous tracts whose opening is inferior. If it collects in pockets, it corrodes the tissues. When the quittor is well toward the heel, a counter opening may be made through the thinned wall below the coronary band, and a drainage tube or seton passed down the fistulous tract and out of this inferior opening. Inject Villate's solution from time to time, following each injection with a carbolyzed oil dressing to the thinned horn, and good results may follow.

TENDINOUS QUITTOR.

Is most serious of quittors, and of indefinite duration. It may complicate cutaneous or cartilaginous quittor, "scratches," or any traumatism of the fold of the pastern.

SYMPTOMS:-

1. Pain, indicated by "isochronous movement," etc.
2. Hypersensitiveness of the region.
3. An anfractuous wound with soft, soapy, necrosed tendon at its bottom, as indicated by the probe.
4. Flabby, easily bleeding granulation tissue.
5. Induration en masse of surrounding tissue.
6. A grayish, or yellowish green, offensive discharge.
7. Often a point of fluctuation 2 or 3 inches above the indurated tissue-- an abscess-- pointing to involvement of synovial sheaths.

ANATOMICAL ALTERATIONS:- The normal glistening, pearly white tendon changes to a dirty-yellow, soft, frayed, and "soapy" one. The necrosis is not easily limited, and if it be in contact with bone or periosteum is apt to cause periostitis, and the subsequent formation of bony spicules (osteophytes) radiating through a large indurated swelling in the fold of the fetlock.

DIAGNOSIS:- Easy from the symptoms.

PROGNOSIS:- Grave because difficult to limit. If the necrosis is in the fetlock it may be excised. If the plantar aponeurosis be affected, the navicular sheath may also be involved; even then we may operate through the sole and excise the necrosed tendon. If the Great Sesamoid Sheath be involved, the case is very serious, indeed.

TREATMENT:- Antiseptic poultices to eliminate slough and prevent putrefaction. Liquids applied should be luke warm, for hot or very cold applications will destroy vitality of the weakened tissues. When possible, lay open the fistulous tract down to the necrosing patch of tendon and remove it. Control hemorrhage by pads of oakum under a roller bandage. Place a firm drainage tube in the fistulous tract, apply an oakum compress dressing, and cut off the ends of the tube close to the dressing. Pus can then escape, and the wound be cleansed without removing the dressing. To cleanse the wound, inject warm water through the tube, and follow by an injection of Carbolized oil, melted Cosmoline, or warm carbolized lard containing no salt. Do this 4-5 times daily.

Actual Cautery and HgCl_2 are not advisable, as they promote rather than arrest the necrosis. Villate's solution followed by water and the oil, as above, may give good results. Tinctura Iodii is a good injection.

Lugol's solution diluted is probably better, as the iodine remains longer in contact with the tissues.

Best treatment is continuous irrigation for 5 or 6 weeks from a hydrant or overhead reservoir. The animal, however, may become detached from the water supply, and in a few hours more harm be done than a weeks irrigation can mend. Where irrigation cannot be employed, use the drainage tube, dressing, Villate's solution, water and carbolized oil as previously described, 4-5 times daily. Notwithstanding the best treatment, necrosis may progress and the animal succumb to purulent infection from a purulent synovitis.

Chapter IV.

" STREET NAIL . "

Is a necrosis resulting from the penetration of a foreign body through any part of the solar horn, or a rising, as a complication of corns, quittors, seams, etc. It most frequently results from the lesions produced by a nail entering the bottom of the foot.

For convenience sake the foot is divided into 3 imaginary zones.

1. Anterior zone is anterior to a vertical plane at point of frog.
2. Median zone is between anterior and posterior zones.
3. Posterior zone is posterior to a vertical plane at anterior extremity of median lacuna of the frog.

The tissues involved in penetrating street nail are of low vascularity and necrose readily. Penetration of $1\frac{1}{2}$ - $2\frac{2}{3}$ of an inch in the median zone is serious, while a two inch penetration into posterior zone may do no harm.

CAUSES:- Horses working in wood yards, about wharves, or on ground recently cleared of underbrush are exposed to sharp foreign bodies. A shoe may become loose and turn so that a nail or clip enters the sole when a step is taken. Sometimes while a horse-shoer is driving a nail on a foot that is sensitive from corns, navicular disease or other cause, the animal flinches, withdraws the foot suddenly and puts it to the ground, pushing the partly driven nail from its proper course into sensitive tissue. The burrowing of pus formed in other lesions may be a cause.

SYMPTOMS:- Vary with the seat and gravity of the lesions. Lameness immediate, intense and persistent. If the penetrating body was sharp-pointed (nail) the immediate lameness disappears in a few hours, but returns in 2-3 days when animal is worked, and is so severe that the foot is held from the ground.

Remove the shoe and examine sole with pincers and hoof-knife. The sensitive point is usually indicated under pressure from the pincers. Nails are usually found in the lateral lacunae, because the sides of the frog and the bars slope toward these depressions; and any body impinging on the slanting sides slides naturally into the lacuna and easily passes through the sole which is here thinnest. Penetrations here enter the median zone and are to be feared. If the nail is discovered, thin the horn about it, and with pincers draw it in direction of its long axis; never move it from side to side, or the end within the sole will wound tissue unnecessarily. Around the point of entrance the horn will be found soft, moist and black from inflammatory transudate. Thin the horn to the velvety tissue, and if no suppuration has occurred there will escape a thin serum, darkened by horn cells which have macerated away in the inflammatory transudate. If pus is present, the discharge will be creamy; if necrosis has set in, it will be thin, serous or bloody and foetid. If the penetrating body was very sharp, it may be necessary to thin the entire sole in order to find the wound.

DIAGNOSIS:- Easy from the symptoms. Excessive and persistent lameness should arouse suspicion that the foreign body is still in the foot. May be difficult to determine how far the foreign body has penetrated, and just what structures are injured.

PROGNOSIS:- Depends on depth and direction of wound. When in doubt, thin the horn, open the tract for drainage, and apply a poultice to keep the part cool and moist. Prognosis will be considered more in detail later on.

The wounds of the three zones are either superficial or deep.

ANTERIOR ZONE, SUPERFICIAL WOUND:- The nail reaches the velvety tissue. Blackish liquid escapes; if the nail has been in long, pus may have formed. This wound may become deep.

ANTERIOR ZONE, DEEP WOUND:- Pus is soon formed, and lameness becomes so intense that no weight is put on the foot. Necrosis of the bone is thus indicated, and is verified by an exploration with a probe. Remove horn from about the orifice and explore with the finger. If moist, gangrene has attacked the bone, the probe will pass easily through it, as through a semisolid holding some "gritty points." Remove the necrosed bone. Lameness abates slowly.

POSTERIOR ZONE, SUPERFICIAL WOUNDS:- Vary little from the same wound of anterior zone.

POSTERIOR ZONE, DEEP WOUND:- Not necessarily serious; may become so if neglected. If pus is allowed to collect it may cause abscess or slough of plantar cushion and plantar aponeurosis. If free drainage is given, the wound heals.

MIDDLE ZONE, SUPERFICIAL WOUNDS:- Seldom serious, except when plantar aponeurosis is involved. Free drainage is all that is required.

MIDDLE ZONE, DEEP WOUNDS:- Serious from likely complications. Plantar aponeurosis is penetrated. If the foreign body be sharp, lameness ceases soon after the injury, but in a few days returns with increasing severity till the function of the limb is entirely suspended. The primitive pain was traumatic, the secondary pain was due to pus. If the pus be creamy, the plantar aponeurosis is not involved, but if it be wine-colored, foetid and soapy, then necrosis of plantar aponeurosis and tendon has occurred. If the Small Sesamoid Sheath has been entered, the probe passes into a cavity after going through the plantar aponeurosis; and synovial inflammation will occur. Should the wound close, pus would collect and convert the navicular sheath into a true abscess. Under inflam. the sheath fills quickly with synovia which becomes fibrinous and later purulent. The swelling appears between the cartilage and plantar aponeurosis, above the coronary band, and to one side of the median line, where it may burst and discharge its pus from 10-14 days after the wound was received.

TREATMENT, for opening of small Sesamoid Sheath. Thin the frog and one-half of the sole; make free drainage, and keep the foot in a moist, cold poultice for from 3-6 weeks. Must be continually cold and moist. This treatment is followed as long as lameness is not marked, and temperature is near normal.

The penetrating body may enter or even fracture the navicular bone. Even a scratch of the articular cartilage covering this bone may cause inflam. and necrosis. If the delicate interosseous ligament be wounded (not necessarily penetrated), a suppurative arthritis may result; though the interfibrous connective tissue of

the ligament may be penetrated and yet heal, for this tissue is vascular and granulates rapidly.

The penetrating body may enter neither bone nor bursa, but only the plantar aponeurosis, and yet require a full surgical operation. The animal shows intense febrile symptoms:- great thirst; arrest of all secretions; constipation; general physical depression hot, dry skin; erect hair and high temperature, indicating extensive suppuration and a general infection-- perhaps moist gangrene of 3rd. phalanx, suppurative phlebitis and pyaemia. The temperature rises to 105° or 104° in the evening and is about 1.5 or 2. degrees less in the morning. In surgical fever the temp. rises to 102.5° , and does not vary beyond $.5^{\circ}$.

It may be 3 or 4 months after a prick that complications are first noticed. Any long continued pedal suppuration is accompanied by great induration around the second and third phalanges, and a ring bone; both disappear when a cure is effected.

PROGNOSIS:- Always serious, for the lesions cicatrize slowly, and rarely without surgical interference. Even after an operation the animal may die or be useless; or the disease may last for months. Most serious in median zone be injured. A rough, irregular object worse than a smooth, sharp one.

ANATOMICAL ALTERATIONS:- Such as naturally arise from the anatomy of the foot. Necrosis or decay of the 3rd. phalanx may occur. Necrosis and decay of hard tissue are synonymous with dry and moist gangrene of soft tissue. Decay spreads rapidly because the pedal bone is very vascular. In 24 hours after decay has begun the entire third phalanx is involved by an invading suppurative osteitis. Necrosis of the plantar aponeurosis is likely to follow if it is wounded in the slightest degree, and this tissue is of such low vitality that the slough cannot separate itself and be eliminated, but the morbid process continues to spread till checked by surgical intervention, or till death of the animal occurs.

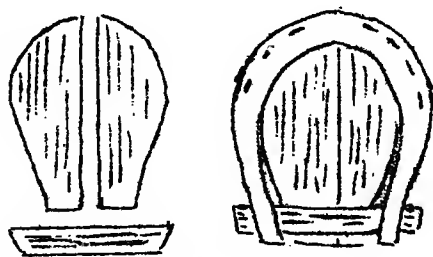
TREATMENT:- Variable. Remove the shoe. Explore with pincers and hoof-knife till the wound is found. Thin the solar horn till blood oozes through; open the wound freely for drainage, and apply cold moist antiseptic pads of oakum with pressure. If suppuration continues, continuous irrigation will check it.

For deep wounds of the middle zone it is sometimes necessary to remove all the necrosed tissue. Cast and secure as for quittor operation. Unsole the foot by making a groove with the hoof knife just inside the "white line," around the sole and through the "bars" just inside of their flexure to form the wall. When blood oozes from bottom of this groove, with a sage knife carefully cut through the thin horn that remains. Raise the sole at the toe upon an elevator, and by this instrument, and by seizing the sole in the pincers and bending it slowly back toward the heel, the entire sole comes away without injury to the Keratogenous membrane.

Divide the sensitive frog (plantar cushion) by a transverse incision at the anterior extremity of the median lacuna, down to the plantar aponeurosis, and remove the wedge shaped piece of frog anterior to the incision. The plantar aponeurosis underneath is removed in two pieces; the tendon is first split in the middle by

an incision from the median lacuna to the semilunar crest, great care being used not to touch the interosseous ligament between navicular and pedal bones, and then cut in two by prolonging the incision, which severed the frog, on either side to the semilunar crest. With forceps raise these flaps and cut them from the semilunar crest. With small hoof knife curette every shred of tendon fibre from pedal bone and interosseous ligament, and curette pedal bone between interosseous ligament and semilunar crest. Do not cut away velvety tissue of sole unnecessarily, and do not injure either plantar vessels to be found in the "plantar fissure," or the interosseous ligament. Finally, curette all cartilage from surface of navicular bone, and curette to the bottom of any puncture of pedal or navicular bone; even if navicular bone be half necrosed, remove the half. In using hoof knife always cut away from the ligament. Any shred of tendon left will necrose and involve the bone where it is attached. The curetted surface of bone granulates readily.

The DRESSING is one-half the cure. Rasp the wall at the heels so that the shoe to be applied will not touch the horn at these points. Apply a thin shoe, wide in the "web" and slightly "concaved;" and long at the heels. Cleanse wound thoroughly antiseptically, opening superior cul-de-sac of small Sesamoid Sheath; pack feathery balls of antiseptic oakum moistened in Carbolyzed oil tightly into the wound, and over them pads of oakum. The dressing is held tightly in place by three pieces of thin tough wood, or hoop iron, as indicated in the figure.



PLANTAR SPLINTS.

Before removing a dressing soak the foot for 15-20 minutes in tepid water to loosen the oakum from the granulations of the wound. Frequently, an obstinate ring bone requiring several firings or even neurotomy follows an operation which has been accompanied by abscess formation about the fetlock. The firing should not be severe. In 6 weeks the removed tendon has been replaced, and the animal may do slow work; in 3-4 months fast work.

For 4-5 days the Temp. will rise 1° - 2° above normal. Give Glauber's Salts and Sodium Carbonate, and temp. will return to normal in 2 or 3 days. Any elevation of temp. indicates trouble. Remove the dressing and granulations, and cleanse the wound, always looking into the navicular sheath. Re-dress as before. If temp. remains normal, leave dressing on 10-20 days, but frequently inject antiseptic solutions into the dress-

L A M I N I T I S O R F O U N D E R .

An inflammation of the podophylloous laminae.

CAUSES are Predisposing and Occasional.

I. PREDISPOSING CAUSES are:- Young age, want of training, and a plethoric condition. Green horses well fed and not exercised may founder after one or two hours work; they

are especially liable if young. Violent exercise after a long rest produces congestion of the most vascular tissues; and when this is added to the physiological congestion present during warm weather, and also to a plethoric vascular system, founder is one of but few inevitable results.

II. OCCASIONAL CAUSES:- Prolonged fast work over hard roads, though walking may develop it. Overfeeding produces Laminitis in summer, and Azoturia in winter. Sudden increase in food may produce intestinal or stomachic congestion (indicated by colic) which by "repercussion is transferred to the feet." A change of food, or an increase given to a poorly nourished animal may cause founder. Diminish the amount of food while an animal "lays off," to prevent Azoturia, Laminitis. Prolonged standing upon one or both fore-feet as in quittor, Pneumonia etc., is an occasional cause. Cold produces a condition closely simulating founder. Simple Uncomplicated and True Founder are much alike in symptomatology. An allied condition to True Founder is Acute Musc. Rheumatism which is constitutional while true F. is local.

SYMPTOMS OF FOUNDER:- Clear and Characteristic.

Temp. 102° - 105° , Resp. depressed, loss of appetite, etc., occur 4-8 hours before the local symptoms are manifest. The objective symptoms are most important and depend on the feet affected. The two fore, or the two hind feet may suffer, rarely all four, or one at a time except when the opposite foot cannot sustain its share of weight. When both FORE FEET are affected, the animal stands perfectly motionless often for a week with the hind feet advanced far forward under the body so as to bear as much of the body weight as possible and so relieve the fore feet. The animal appears rooted to the spot, moves unwillingly and with great pain and difficulty, and will suffer pangs of hunger rather than advance to the manger. When forced to advance, the hind feet first advance farther under the body; the body sways back, only the heels of the fore feet touching, and the animal makes a sort of jump, raising the fore feet simultaneously, advancing them, and alighting on the heels to save the toes.

Though horn is a poor conductor of heat the hoof is very warm, and percussion shows tenderness of the laminae. Exercise limbers the animal, by temporarily drawing blood from the congested feet; but the stiffness returns on rest.

POSTERIOR FOUNDER:- Animal stands with all four feet bunched under the centre of gravity, attempting to bear as much of the weight upon the fore feet as possible. Foundered animals will stand till they drop from exhaustion, and will then never rise again. Therefore, early in this disease either cast the animal and rest its feet, or place him in slings. The movement of a slightly foundered animal over soft ground resembles the motion of a horse with Pleurisy or Peritonitis.

DIAGNOSIS:- From the local and rational symptoms. In acute founder the temp. is from 104° - 105° , with the other febrile symptoms.

PROGNOSIS:- Serious, especially if in anterior feet, because they are never again perfect organs of support. True in a less degree of posterior feet. The intense pain may kill a thorough-bred in a few days.

TERMINATIONS:- Vary according to the degree of inflammation.

- Four Stages. { 1. Delitescence. (Congestion).
2. Resolution.
3. Inflammatory new formation.
4. " disintegration (hemorrhage).

1. DELITESCENCE means the disappearance within a few hours. of all symptoms, with apparent complete recovery. There is no inflammation.

2. RESOLUTION:- A true inflammation, which retrogrades till, after 10-15 days, all symptoms have disappeared. A slow, but fortunate termination. It is a simple Acute laminitis which may, however, run into Chronic Laminitis or

3. INFLAMMATORY NEW FORMATION:- Fever disappears, but pain and inflam. in the feet are persistent (chronic). The chronic inflam. of the laminae stimulates their latent function to produce horn, so that excess of pathological horn is produced and the normal structure and shape of the foot are altered. This is an unfavorable termination, for though normal health is regained, the altered feet render the animal unserviceable.

4. INFLAMMATORY DISINTEGRATION (hemorrhage and transudation). When the primary congestion is so intense as to rupture one or more vessels of the podophyllous tissue, the blood separates the Kera-phyllous and podophyllous tissues and mounts till it appears and escapes at the edge of the hair at the coronet, as a red frothy liquid of the consistency of churned albumen. The pain diminishes with the outflow of blood and separation of hoof and coronary band, suggesting that local bleeding might be advisable in early stage. A good recovery may follow this termination; or serious symptoms appear about 3 days after the hemorrhage. The blood may be unable to escape, form a clot, compress and cut off the blood supply from the inflamed laminae, and gangrene of the laminae and pedal bone follow.

A double toe-crack operation may effect a cure and is justifiable after such a hemorrhage.

TERMINATION BY TRANSUDATION is a division of this 4th. stage. The inflam. has not been severe enough to produce hemorrhage, but has caused a transudation of plastic lymph into the connective tissue spaces of the podophyllous tissue, and between the fleshy and horny laminae, separating them and perhaps escaping at coronary band. The lymph coagulates, organizes and exerts even more pressure than a clot of blood would do, so that gangrene, necrosis, etc. of deeper tissues frequently results.

PATHOLOGICAL LESIONS OF ACUTE FOUNDER:- None in the first stage. After hemorrhage, an organized membranous layer is found between Kera-phyllous and podophyllous laminae, and may appear above coronary band.

TREATMENT OF ACUTE FOUNDER:- If seen during early stage of congestion we may resort to

- (a) blood letting,
- (b) counter-irritation,
- (c) exercise,
- (d) cold moist applications to the feet.

(a) From the jugular vein (never from toe, coronet, sub-cutaneous vein of forearm or other small vein) draw in full stream 5-10 quarts of blood, depending on the condition of the vascular system. Bleed till pulse softens. In about 12 hours after, the blood has regained its original volume by absorption of serum from tissues of body. If inflammatory symptoms remain or return, bleed again, even 3 or 4 times, allowing in each case an interval of 12 hours. At each bleeding, the blood being more highly diluted with lymph, a less number of corpuscles are drawn away. Such treatment may induce recovery by "delitescence."

Scarification of the coronet may produce cutaneous and cartilaginous quittor, phlebotomy of small veins is dangerous on account of ease with which suppurative phlebitis arises. In Denmark foundered animals are stood in ponds containing leeches, and this local blood letting and cold irrigation is markedly beneficial. English veterinarians used to pass a seton under the frog from heel to apex, but as this interfered with the animals resting on their heels, this treatment was finally abandoned.

(b) Counter-irritants, in form of liniments or blisters, to chest or forearm, to draw blood from the inflamed feet to the inflam. produced by the blister.

(c) Exercise on soft moist ground (meadow, or ploughed land) relieves congestion of feet; "limbers" the muscles with the least pain from percussion.

(d) Irrigation with cold water in a creek, pond, tub containing iced water, clay-hole, from an overhead reservoir connected by tube with an oakum or bran foot-poultice, is good treatment. If the animal is "down," a poultice must be used. After a few hours of irrigation in cold water, apply hoof ointment and give slow gentle exercise on soft ground for about 1/2 hour, and return to the irrigation. Cold tones the arterial walls and aids constriction of the distended vessels.

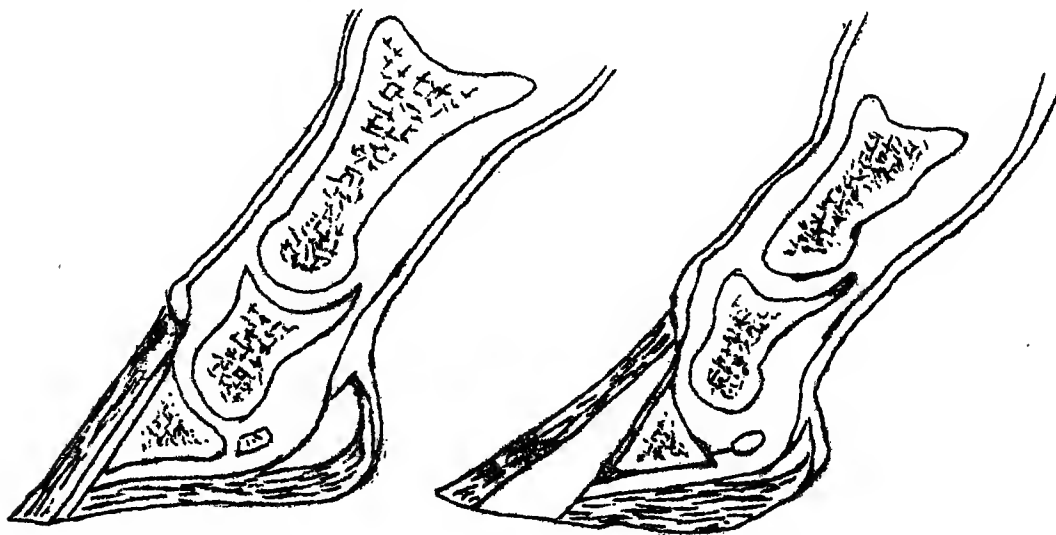
When laminitis is due to such causes as might have produced a Pneumonia or an Acute Musc. Rheumatism, viz:- wetting and chilling (Repercussion), large doses of a mixture of the Nitrate and Chlorate of Potash is indicated.

If pain be so intense that an animal can neither stand nor be supported by slings, and it is allowed to get down, it will die before long of pulmonary or intestinal disturbances. In such a case the greatest hope lies in simple section (not excision) of plantar nerves high up, or section of anterior branch of digital nerves. Follow by ice bath and exercise, and the condition may yet terminate by Resolution. Any unfavorable complication will appear within 10 days to two weeks. The ends of the severed nerves unite in about 3 weeks.

Laminitis following Summer Colics appears suddenly and has the same symptoms, and yields to same measures as an Acute Laminitis from any other causes. This inflam. is called "metastatic," in-as-much as the original abdominal congestion entirely disappears on the advent of the laminitis. Laminitis accompanying Pneumonia is non-metastatic (as the lungs continue to be inflamed) and is caused by long continued standing.

The laminitis following parturition is due to the engorgement of vascular structures by a large quantity of blood which during pregnancy has been circulating through the maternal sexual organs. It requires no treatment other than already detailed.

INFLAMMATORY NEW FORMATION; LOCAL LESIONS:- In a few days the symptoms of Acute Founder disappears slowly, except the lameness which in spite of treatment becomes chronic. The animal travels on its toes. The horn of the wall becomes corrugated by digital grooves, and in this state is known as, "rammy horn." It is due to an exaggerated secretion of the coronary band, and the difficulty it experiences in passing downward over the horn cells secreted by the podophyllous laminae. In health these laminae secrete just enough of a soft mucilaginous white horn to unite themselves to the wall and to allow the latter to glide over them as it grows down from the coronary band, But under the stimulation of inflammation the wall grows rapidly and irregularly, and the podophyllous membrane secretes such an excessive quantity of soft horn that the wall is pushed from the pedal bone by a wedge-shaped mass whose apex begins at the sub-coronary space and whose base appears on the sole as a greatly broadened "white line." See figures below.



NORMAL.

LAMINITIS.

This wedge of pathological horn not only forces the wall of the toe forward and upward, but crowds the pedal bone backward and downward against the solar horn which "drops" in consequence. The heels grow fast and the foot becomes sandal shaped, the animal resting upon the prominent heel and "dropped sole," with the toe either clear of the ground or touching lightly.

RATIONAL SYMPTOMS OF ACUTE LAMINITIS:- When passing into the chronic state pain diminishes, but don't disappear; the gait is peculiar and characteristic; heels bear the weight, and shoes wear most at heels. The horn of the white line on the sole is soft, dry and earthy, like earth about an ant's nest, and is called in Europe "Ant's Nest;" in America it is called "Seedy-toe," and "False quarter" when at the "quarters." This condition is really the result of--

INFLAMMATORY DISINTEGRATION, either by true hemorrhage or by extravasation of lymph (white hemorrhage). The blood or lymph separates the wall and podophyllous tissues and prevents their uniting. The crack which results appears at edge of the sole; may be wide enough to admit a finger or scarcely discernible, and contains a dry, crumbling, granulated material. The podophyllous laminae may in time atrophy and disappear, leaving only the processigerum reticulum, which continues its horn secreting functions, with serious results. Processig. Retic. may necrose under pressure and involve the 3rd. phalanx.

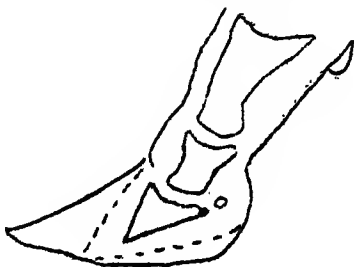
DIAGNOSIS:- From character of foot, movement, etc.

PROGNOSIS:- Serious. Difficult to restore the deformed foot to normal. Hopeless if an old case. May operate with some success for "zeedy-toe" or "false quarter." Frequently a crescentic mark is to be seen on the sole where the plantar border of the 3rd. phalanx touches the sole. The pressure of this plantar border causes atrophy of the velvety tissue, and finally a hernia of this border of the bone through the sole, resulting in inflam. and necrosis of velvety tissue and bone. The complications that may arise interfere with the prognosis. It is better in case of stallions and mares kept only for breeding purposes, and in that of horses whose work is slow and upon dirt roads, than in horses whose work is fast and over paved streets.

TREATMENT OF CHRONIC LAMINITIS:- Aim by trimming and shoeing to restore the natural conformation of the foot. In very bad cases we may remove the entire wall by thinning, and also remove the horn piled up by the podophyllous tissue. Soak the feet and then apply a fatty dressing. Remove the horn secreted at the coronet and on the laminae every week till the growth seems uniform and smooth, always following with irrigation and a fatty dressing. Animal may thus be made serviceable.

If 3rd. phalanx has passed through the sole and necrosed, curette it away. If the sole is herniad, but intact, pressure on the pavement causes soreness, to relieve which there is a special shoe made by Broad of Bath, Eng. The French employ a light shoe filled in with gutta percha.

Another treatment consists in restoring the 3rd. phalanx to its normal position by paring away the heels and shortening the toe as indicated in the figure by the dotted lines.



According to Nocard, in about 15 months the animal will be serviceable. Again, when "classical" means fail, employ neurotomy. Nocard saw the best of results from this operation, viz:- restoration of normal position of foot, and normal gait.

CAUTION:- The foot has undergone serious alterations of nutrition previous to the neurotomy, and the chances are that such an operation, by severing the trophic and vaso-motor nerves to the foot and causing chronic congestion, will cause the hoof to slough

off. It is therefore, a dangerous experiment.

NAVICULAR DISEASE.

NAVICULAR DISEASE is any lesion of any of the structures composing the navicular sheath; usually, the navicular bone and perforans tendon are involved. Although the lesions, if any, are in the feet, the symptoms are characteristic of shoulder lameness.

SYNONYMS:- Podo-sesamoideal Synovitis; Chronic Podo-trochlititis; Navicular Arthritis.

ETIOLOGY:- Uncertain. Usually observed in high-stepping, prancing, well-bred horses; jumpers, hunters, saddle-horses, probably because of the violence sustained by the navicular region. Less often observed in low-gaited, slow-moving, lymphatic horses.

SYMPTOMS:- May arise suddenly after a jump or other severe muscular exertion, in which case it is clearly traumatic; or may come on gradually. The gait is peculiar, and has been called "Pegged Shoulders" from their lack of motion. The step is short, and taken cautiously- "like a cat walking on hot bricks." The animal's weight is borne by the toes to relieve the navicular structures within the heels. This is proven by examining the shoe; the toe may be worn through and yet the heels be scarcely worn at all. The animal "points" when at rest, and the foot thus advanced may show "isichronous movement." When the disease is in both feet, they are alternately advanced and withdrawn as the weight is shifted from one to the other. This pawing carries the litter toward the foot of the stall, where it accumulates. The animal lies down often to rest the feet, and may go hungry rather than rise to eat, in which case ematiation more or less pronounced ensues.

Other symptoms result from loss of function of the foot by reason of the "pointing" and shortening of the pace, namely; contracted heels and contraction of flexor tendons. Contracted heels usually follow navicular disease, as well as predispose to navicular disease. The tendons contract when their function is arrested, and a permanent knuckling results. The perforatus tendon may contract more than the perforans; receive so much strain as to induce a periostitis at its attachment to the os corona, which results eventually in a large ring bone.

The lameness is intermittent, and resembles rheumatism. If the animal starts sound in the morning, he will return sound. If he starts out lame, he may return sound, and even remain so for a month. As time passes, the lameness becomes more frequent and more pronounced, but always improves greatly on exercise. Guard against the history of ring bone lameness, which is intermittent-improving with rest, and getting worse on exercise; and against splint lameness, also regularly intermittent- disappearing on rest, and increasing on driving.

Percussion on the sole produces pain, as does also pressure with pincers on bars and across the heels, though burnt sole, corns, thrush, and a close nail would also give pain on pressure. There may be fever in the fold of the fetlock. The lameness is less marked on soft ground, because of the lessened percussion.

DIAGNOSIS:- Usually easy, from the short gait, "pegged shoulders," "pointing," contracted heels, intermittency of the lameness, tenderness on percussion, nature of animal's work, etc. Cocaine injected over plantar nerves will show whether the lameness is above or below the point of injection.

ANATOMICAL ALTERATIONS:- Well marked at times, but occasionally absent. May have inflam. of walls of navicular sheath followed by their adhesion (dry synovitis); or ulceration of the bursa; or hemorrhage into the bursa filling it with a thick tarry liquid. In synovitis the synovial fringes may hypertrophy, undergo calcareous infiltration and become pinched off into the bursa as small calcareous shot which produce intense lameness. Navicular bone may undergo Condensing or Rarefying Ostitis. When there is an inflam. of the navicular bone (ostitis), the deeper layers of the articular cartilage ossify, followed by those more superficial till all have ossified, and the original cartilage has been transformed into a thin hard varnish-like material. The bone swells, the ossified cartilage does not, but cracks and peels off into the bursa, leaving ulcers on the denuded surface of the bone. The tendon playing over this roughened bone surface is chafed, frayed and torn, till there is an inflammation, or even a rupture of the tendon.

However, no lesion may be apparent till the bone is laid open and an ostitis of the cancellated tissue revealed, which has not yet attacked the cartilage. The sole lesions may be 5 or 4 dark spots on the cartilage of the navicular bone.

TREATMENT:- Only palliative. An incurable disease, whether treated early or late. All treatment should aim to make the animal serviceable.

In early stage give absolute rest, and favor expansion, or retard contraction of the heels by thinning sole till blood oozes therefrom, and standing the animal on soft moist litter, or on a meadow. The contraction may yield to treatment, but the lameness will gradually return under work.

Bleeding at the toe, once employed in England, is dangerous and ineffectual, and now in disuse.

Bleeding from the thinned frog is also bad treatment. Frog seton of horse-hair or other material passed from heel to point of frog through plantar cushion parallel to plantar aponeurosis is recommended by some veterinarians, but is of no special value, and is liable to serious complications.

Blister in the heels, much used by early Eng. Vet's., is contra-indicated, because of the thick non-vascular skin of this region, which when inflamed and stretched by the inflammatory transudate, cracks, fills with pus, and is liable to end in cutaneous or even tendinous quitter, from which a large callous wound results. A blister must never be applied in the fold of the fetlock.

Actual Caustery is more apt to produce slough than the blister is. Both do good by enforcing rest, rather than by any other action.

A Dufay's shoe to temporarily overcome contraction is palliative treatment. Spread the heels each week, or every 5 or 4 days, by means of a screw which acts between the heels of the shoe; in the intervals keeping the feet soft by footbath or poultice. However, none of these measures can cure navicular lameness, and to

make an animal serviceable we must resort to neurotomy.

NEUROTOMY, performed as described on pages 96-97 in Part I, gives the best result, and often allows a horse, without pain, to work on hard roads for a long time. It does not remove the original lesion; it merely destroys sensation for a considerable time. When the foot drops off after this operation, it is not due so much to suppression of nervous influence, as to a faulty operation; a suppurative phlebitis, or a clot in the digital arteries by which the foot's blood supply is shut off. Use greatest care not to injure artery, vein or lymphatic vessel, all of which lie anterior to the nerve.

Section of posterior branch of digital nerve (low operation) may do much good, but usually results in a true or false neuroma on nerve stump from constant motion of this region. Neuromas are excessively painful and must be removed. The "low" operation usually suffices only for a few months, and must then be followed by the "high" operation, which has all its advantages without the disadvantages, and hence is to be preferred. In cutting the internal plantar nerve, go above the transverse branch to prevent the cicatrix from being brushed, should the animal "interfere" when travelling; otherwise, it would be better to cut both plantar nerves below the transverse branch. Fleming has shown that horses operated upon "high" neither slip nor fall more than those operated on "low". After a time the nerve unites, but the animal does not go lame from navicular disease. The sensation returns, but pain is not registered, probably because "a pathological condition has become physiological."

T H R U S H .

THRUSH is a true eczematous inflammation of the keratogenous membrane. It is a functional disease, and develops under a constitutional diathesis, though sometimes it may be said to be due to local causes. In bad cases brushes of horn comparable to a frog's foot are seen. This brush-like appearance is due to the horn from the papillae coming into contact with the ground, and being frayed.

CAUSES:- Predisposing and Occasional.

I. Predisposing causes. RACE. Frequent in large, flat-footed, low-heeled, coarse haired, thick skinned, lymphatic horses bred in low, marshy districts. Inferior ventilation and poor drainage are prolific causes of Thrush. In badly drained stables it affects the mares' anterior and the horses' posterior feet. Pools of stagnant, fermenting water lying in travelled roads cause this disease. Tow-path horses are subject to it. Contracted heels is rarely a cause. When thrush is present in the closed median lacuna it is called, "Sweated Frog." Fermenting liquids may enter the lacunae, pass through fissures in the thin horn of these regions to sensitive tissue, and cause keratogenous membrane to inflame and produce an abnormal secretion. With a mild attack recovery is quick, but in a few weeks it may re-appear in the same or another foot. This ambulatory property suggests a true rheumatismal diathesis, and we know that rheumatic conditions most frequently arise

in animals dwelling in damp climates and in unhygienic stables. Nocard says., that an eczematous transudate arrested at one point break out at another, but if this were true the eczema would be most apt to break out on the skin, which it does not do. Nocard's theory is opposed to the theory of a rheumatismal diathesis.

SYMPTOMS:- Vary with the age of the disease. At first a slight oozing of a thin, foetid, opaque liquid from the bottom of the median lacuna. A whitish, caseous material is at bottom of the lacuna. As the disease ages, the exudation becomes thicker and more foetid. Rarely does thrush begin in the podophyllous tissue. Later, when sensitive tissue comes in contact with the ground and is injured, the case is presented for treatment. As in eczema, the older the disease, the less susceptible to treatment. The secreting membrane no longer secretes hardening horn for a true sole.

ANATOMICAL ALTERATIONS:- The living tissues, exposed through the fissures, irritated by contact with foreign bodies, actively inflame, the papillae become hypertrophied and the epiderm is exfoliated. A number of papillae agglutinate and appear as a reddened, pedunculated tumor. Around the papillae are large, whitened, fatty or caseous horn cells, which are true horn cells which have absorbed the albuminous liquid in which they are bathed, and cannot form true horn. These cells undergo fatty degeneration and accumulate at the bottom of the fissures as a fatty, cheesy material. Great hemorrhage follows the excision of the papillae. In old cases the papillae are long, flabby and filamentous, indicating that in portions of the keratogenous membrane the malpighian bodies still retain their physiological functions and continue to produce normal horn cells; while around them an eczematous condition exists. This eczematous condition advances to the border of the sole, may mount the podophyllous laminae to the coronary band, and may separate the entire hoof.

Eczema or thrush cannot cause glanders or farcy, but the debility which they produce may cause latent glanders or farcy to manifest themselves; or, glanderous material may pass into the system through the exposed vascular tissues of the foot, and cause the disease.

It has not been shown that thrush is due to cryptogams, and any that may be present are probably the result rather than the cause of the disease.

DIAGNOSIS:- By the odor. If the foot looks normal, the disease will be found at the bottom of the median or lateral lacunae, manifested by a cheesy secretion. Sometimes when examining the foot for cause of an obscure lameness we discover thrush, and that it has attacked the keratogenous membrane at some point and produced the lameness.

PROGNOSIS:- Grave, because it is constitutional, tenacious and rebellious. Be guarded in your prognosis as to time; the duration will be in proportion to the lesions, taking into consideration the animal's diathesis. The prognosis is more serious in a flat-footed lymphatic horse than in a thoroughbred. If the solar horn and a part of the podophyllous tissue or coronary band are invaded it is almost incurable, for under these conditions the hoof will probably separate from the foot. Thrush is more tenacious in old horses,

and is uninfluenced by any drug. It is purely a constitutional disease, with local manifestations in the feet.

TREATMENT:- Difficult. Many alleged specifics.

I. It has been recommended to strip away the sole and remove the hypertrophied villi (thought once to be the root of the evil) by actual cautery. Solleysel removed them with an ointment composed of Copper Sulphate, Zinc Oxide, Arsenious Acid and strong Aqua Ammoniae. This ointment is dangerous and not to be used. He also recommends actual cautery in extreme cases. Such treatment has produced "street-nail" by ~~compressing~~^{compressing} the plantar aponeurosis.

II. Nocard modifies the vitality of the tissues by using Nitric Chromic and other acids, but these acids give as bad results as does Solleysel's ointment. The difficulty is that many caustics in powder form are hygroscopic, and continue to burn and destroy tissue till they extend too deeply and involve the plantar aponeurosis which lies very near the bottom of the median and lateral lacunae. It is also just as difficult to limit the action of acids. The conformation of the foot drains liquid acids into the median lacuna, where they act so long as any acid remains; hence such treatment is dangerous, as it is apt to produce slough and involve the tendon.

III. By operation, modified according to extent of the lesion. Expose the diseased parts, and thin solar horn and frog nearly to the blood. Scrape away with sage or hoof-knife, the brushes of horn which prevent free access of the dressing, down to velvety tissue. Remove all cheesy accumulations. Cleanse the parts with an antiseptic, and apply a poultice containing carbolic acid to soften the horn. Next day when horn is soft remove poultice, cleanse the foot and thin the horn to thinnest possible film, but don't draw blood. Can now form a prognosis, from the number and size of the hypertrophied papillae, some of which may be of size of kernel of corn. If the papillae are old and large, excise them. May get an enormous hemorrhage and be obliged to apply a tourniquet to the fetlock. Examine entire sole with probe, and remove all loosened horn, even if over entire sole. If one-half of podophyllous laminae is separated from the wall, better not treat the case. If there is a single fistulous tract from 1/2-2/3 of distance from sole to coronet, remove the wall over it. It is 10 times more difficult to cure, when it has invaded the podophyllous tissue. Leave enough horn to hold the shoe. It is essential to leave no spot covered with horn, and to avoid drawing blood. When this is done, the foot is ready for one of a variety of dressings.

(a) Spray the parts for 3 hours with a 1-500 Corros. Sublimate solution to allow it to thoroughly penetrate the tissues. Follow by a penetrating street-nail dressing saturated with Hg Cl₂ solution, and leave on for 2-3 days; then remove dressing and repeat. This is anti-parasitic treatment.

(b) May use certain coal tar products, oil of Cade, oil of tar, or crude petroleum, combined with pressure as in street-nail dressing; or uncovered as applied by Vivier. He recommends placing a sheet of iron between shoe and foot to keep foreign bodies from the affected tissues.

Objection is that heels are open, and filth enters at that point, and foot cannot be easily or thoroughly cleansed. Vivier used as a caustic a solution of the Sulphuret of Antimony in Hydrochloric acid, which modified the caseous secretion, but is no better than many other caustics.

(c) In using the Sulphuret of Antimony add a little excess of HCl. When first applied, leave on 48 hours, then remove the dressing and superabundant horn cells, and reapply thoroughly. Whatever substance is used, the results will depend mostly on the frequency and thoroughness of the cleansing and application. Any drug good for eczema will do for thrush.

(d) Strong Carbollic Acid in crystalline form is an excellent superficial caustic. Apply it thoroughly to the cleansed parts, keeping it away from the skin. It is an excellent germicide. Crystallized Carbollic Acid may be sprinkled upon oakum and applied, with best results. At same time give constitutional treatment-alteratives; Donovan's Solution is best.

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Chapter V.

GANGRENE, NECROSIS, CARIES, PYAEMIA, SEPTICAEMIA.

GANGRENE:- Two kinds:- Dry and Moist.

Gangrene is a cessation of vital phenomena in a tissue or organ. Virchow calls it "Necrobiosis" when occurring out of contact with the air. In this case all phenomena occur, except decomposition. Gangrene applies to the death of soft tissues; "necrosis" and "decay" to the death of hard tissues- bone, cartilage.

DRY GANGRENE:- is a death of soft tissues due to an obstruction to the arterial blood flowing to the part. Blood is with-held, and the part dies in an abnormally dry condition. The causes of this arterial obstruction are numerous:-

1. Compression of arteries, by harness, etc., producing corns on neck, sitfasts on back from saddle, etc.
2. Cauterization with actual cautery.
3. Therapeutic agents, as Ergot.
4. Atheromatous changes in arterial walls.

Ergot acts by constricting the terminal arterioles. Actual cautery destroys tissue, and rapidly evaporates its fluids, leaving the blood-vessels closed and the tissues so dry that fermentation does not follow. We can even change moist gangrene into dry gangrene by actual cautery. Such chemical caustics as H_2SO_4 applied to moist gangrene absorb moisture and produce dry gangrene. Arsenic kills tissue, but absorbs no moisture, hence produces rather a moist gangrene.

Compression of arteries is most frequent cause of dry gangrene. Heavy collars and saddles produce corns of neck and sitfasts of back (dry gangrene) by squeezing the blood and serum from the tissues during a considerable space of time. Prolonged decubitus causes dry gangrene of skin pressed between prominences of the

skeleton and the surface on which the animal reclines. A defect in conformation, or an awkward manner of lying down often causes "shoe-boils" (dry gangrene) by the heel of the shoe pressing upon the summit of the ulna. Where a neurotomy or tenotomy dressing has been applied too tight, dry gangrene may be produced under the bandage, and moist gangrene in the foot.

SYMPTOMS:-

1. Prodromes (precede the slough).
2. Confirmed gangrene.
3. Demarcation (separation of dead from living).
4. Cicatrization.

PRODROMES may be absent. Usually, a slight febrile disturbance; some pain, indicated perhaps by a little lameness when a foot is involved.

CONFIRMED GANGRENE has certain physical, chemical and physiological properties worthy of study. Color assumed may result either from pathological changes or from treatment. The skin first blackens, but under $H\ N\ O_3$ turns yellow. The subcutaneous connective tissues turn to a canary yellow. The nuchal ligament turns to a pale washed out green, spotted with brown. Muscular tissue becomes mahogany brown, fading with age and becoming soft and friable. Cartilage turns bright green; fibrous tissue a dirty yellow, and feels "soapy." Blood vessels and nerves are slow to necrose, and become a deep violet color.

In proportion as the slough dries out it shrinks in volume, retracts from the living tissues, changes color, becomes cold, acts as a foreign body and causes peripheral irritation of living tissues. Granulations are thrown out, and secrete pus which assist in separating the dead from the living tissue. The first indication of such a separation is called the "line of demarcation;" later it widens to become the "furrow of separation." Heat, redness and extreme sensitiveness now exist in the living tissues; but the mortified part has lost its sensation, heat and normal color. The slough usually undergoes cellular degeneration very slowly owing to lack of moisture; but a dry gangrene may absorb moisture from a furrow of separation, and become moist.

DEMARCATIION:- Separation goes on gradually, but fibrous bands continue to hold the slough in place. The irritation of the slough is the most powerful factor in its elimination. The nearer embryonal a tissue is, the more rapid its elimination. Connective tissue separates in a few days; skin in a few weeks; bones and tendons in several months. Granulations contain no lymphatics and cannot absorb poisonous substances from the slough. So long as laudable pus is formed in the "furrow" the elimination progresses favorably, but the appearance of ichorous pus indicates a further invasion of the necrosis.

CICATRIZATION:- The cavity left after casting off of the slough fills rapidly with granulations, and is surrounded by an elevated hard border of skin. Epithelial cells from this skin gradually grow out and cover the wound. The skin of the cicatrix contains none of the glandular elements of true skin.

TREATMENT:- General. To facilitate elimination of the slough, apply a poultice moistened with an antiseptic to destroy all atmospheric and putrefactive germs on the wound. When slough comes away, treat as simple wound. If on the fetlock, treat under pressure or a large callous wound will result.

If unfavorable to use a poultice, we may employ an ointment of Belladonna, or Populium, or Opium. These three drugs allay pain and the fatty materials of the ointment keep the parts soft. When slough is eliminated, treat by pressure to keep down granulations.

Where neither poultice nor bandage can be used, as on corns on neck, apply a strong Cantharides blister to remove the sensitiveness of the part, and by producing an oedema to stretch the skin and bring the corn to the surface from the fold of skin in which it is usually found. In tenacious stiftasts it may be well to apply a blister about the part to increase blood supply, and thus hasten elimination.

MOIST GANGRENE:- is death of tissues full of blood and serum. Moist gangrene is Local, or General; the latter being often called "Traumatic" or "Invading" gangrene, sometimes "Hospital" gangrene (Septicaemia).

CAUSES of Moist Gangrene:- Any thing that arrests flow of blood and serum from a tissue, or organ. Arrest of blood in veins, while the arteries continue to carry blood to the part, causes it to die, bathed in unoxidized and stagnant blood.

Inflammation, by producing stasis of capillary circulation, is a cause.

Continuous compression, as by ligature placed just tight enough to occlude the lumen of the superficial and easily compressible veins, but not tight enough to occlude the deeper and stronger walled arteries, which thus continue to force blood into the part, is the common cause of moist gangrene; and the ligature is the type of this compression. The part swells; at first grows warmer, turns red, and finally a dark purple; loses heat and becomes cold as death comes to it. Always bandage an extremity from its distal end towards the heart, so that no blood can remain in superficial veins.

Freezing causes moist gangrene by stopping the venous circ. in the periphery. Heat does the same by causing inflammation, and swelling which compresses the veins. Fire in points or lines usually produces a dry slough, but sometimes produces such an intense inflam. swelling and oedema that all surrounding tissues are compressed, their nutrition shut off, and they slough away, opening at same time important synovial or articular bursas. Use actual cautery very carefully about joints.

Embolus in an artery may produce a dry gangrene when there is no collateral circulation; but a thrombus in a vein can scarcely produce a moist gang., so rich is the collateral circ. of veins. However, when in a fracture, a splinter of bone occludes the vein at the nutrient foramen of a bone, moist gang. may result.

Abscess in dense tissue may, by pressure on tendons, cause them to necrose.

Neurotomy by taking away sensation of foot may allow an inflammatory lesion, such as a close nail, corn, etc., to advance till gangrene is formed.

Such a complication is to be feared before the 4th. or 5th. month, at which time sensation ~~is restored~~ by union of the nerve.

Anasarca is a frequent cause (compression). Treat an anasarca by making many punctures with a lancet, to allow serum to drain from the distended tissues.

SYMPTOMS of Moist Gangrene:-

1. Prodromes.
2. Confirmed gangrene.
3. Elimination.
4. Cicatrization.

These four stages differ from those of Dry Gang. only in the character of the slough, being moist instead of dry. The pain, inflammation, swelling, elimination, etc., are the same as described. The pain due to obstruction of a vessel by an embolus is not lancinating, but "pricking."

In the second stage the pain ceases, the exudate appears, a disagreeable odor arises, and putrefaction begins when air can reach the part.

DIAGNOSIS:- Should be made as early as possible.

PROGNOSIS:- More grave than Dry gangrene, and depends on tissues involved, and condition of the animal.

PATHOLOGICAL ANATOMY:- Differs but little from that of Dry Gangrene. The vessels are filled with coagulated blood, and the corpuscles contain pigment granules and have undergone fatty degeneration. Many atmospheric germs are found in the moist slough.

TREATMENT:- Preventive and Curative.

Preventive removes the cause before it has time to produce gangrene. If there exists compression of an intestine, as in strangulated inguinal hernia, we may relieve the pressure by withdrawing the contained gas or liquids through an aspirating needle.

Local bleeding will often relieve congestion and pressure of an inflammation.

A fine spray of cold water thrown with force against a part relieves congestion, and imparts a healthful massage at same time.

Actual and potential cautery, metallic sulphates, and salts of Tannic Acid are employed to hasten elimination of a slough.

Continuous irrigation is the best general treatment, after the preceding.

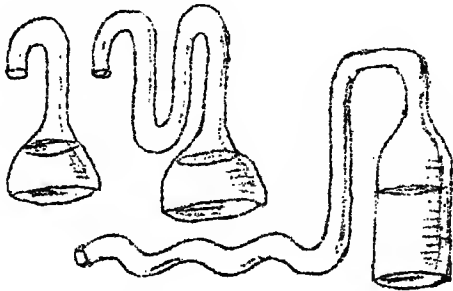
SEPTICAEMIA:- Synonyms are; Traumatic, or Surgical, or Hospital Gangrene. It results only from open wounds. Renault and Bartholini, after losing 60% of their surgical cases by this complication, began its first systematic study. They recognized the fact that a blood tumor opened and exposed to air was followed by septicaemia, which did not follow if the tumor was not opened. They also noticed that septicaemia occurred most frequently where the ventilation was poorest and other conditions most unsanitary, and therefore attributed the disease to septic atmospheric germs.

Pasteur at first thought that oxygen caused putrefaction, because blood kept out of contact with air did not putrefy. He made glass bulbs, drawn out to a fine point at one end. These he heated to expel the contained air, and then sealed by fusing over a flame. The fine point was thrust into a blood vessel, the point broken off within the vessel, when blood would rush in to fill the vacuum in the bulb. These bulbs sealed, and set aside showed no

putrefaction of contents.

Later, Pasteur found that air admitted to blood, after passing through a plug of cotton, was powerless to produce putrefaction. The cotton, he thought, filtered from the air some germ that was a cause of putrefaction. Finally, he learned by experimenting with goose-necked flasks, as shown below, that in still air these germs of putrefaction settle; and that blood might often be preserved from putrefaction without the intervention of a cotton filter, if the air admitted to it had to pass through an inverted, or long horizontal neck. With this arrangement the germs either could

not settle into the neck, or if they could, would fall upon the inner side of the neck before reaching the blood in the base of the flask.



Cullen, of Alfort, proved by experiment that the germs of Charbon and glanders travel not by the blood channels, but by the lymphatics. The lymph glands arrest the germs, inflame, and finally break down and allow the germs to pass on and cause a new invasion. Granulation tissue contains no lymphatics and cannot take up septic germs of this disease. Therefore, we can open an abscess with impunity, because its walls are covered by granulations; but it would be dangerous to open a blood tumor or cyst because their walls are not covered by granulations, and do contain exposed lymph channels. Always convert a cyst or blood tumor into an abscess before opening.

In 1877 Pasteur announced the discovery of the "septic vibrio" a microscopic germ found in decomposing material, and dependent for life upon oxygen—either free or in combination. As soon as oxygen is used up in a tissue, the septic vibrio either dies, or advances into living tissue. The vibrio is about 10 times as long as it is broad, and about 20 times larger than the Charbon vibrio. It is "hour glass" shaped, and very motile. It develops best in a lacerated bloody wound at a temp. of about 80 degrees Fahr. The vibrios gain access to a clot, multiply by segmentation or spores, spread into the lymph spaces of the connective tissue, thence into the lymphatics. They kill tissue by robbing it of oxygen.

ETIOLOGY OF SEPTICAEMIA:—The septic vibrio gaining entrance to the lymph spaces in the connective tissue of an open wound unprotected by granulation tissue. It frequently complicates castration by the "covered operation," and may follow an ordinary pneumonia by gaining access to lymphatics in the inflamed lungs. Lister of Edinburgh taught the world the antiseptic treatment of wounds. The air of pine forests is quite free from septic vibrios, as is also that of country districts, and high altitudes.

SYMPTOMS:—At first Local, then General.

Swelling. At onset, when germs invade lips of wound, a certain area about wound suddenly swells, becomes hot, red, oedematous, and is clearly limited.

In a short time the oedema subsides, the tissues shrink and harden—no longer "pitting" under pressure, the color changes to violet, and the temp. falls. Pain present during oedematous period. A dirty reddish serum is discharged from the wound, if the invasion has been rapid and soon after the wound was received; but if it occurs after suppuration, then we notice a decrease in amount of suppuration, a discharge of a greyish serum, and many granular bodies in the pus corpuscles. The pus cells are apt to be in a state of disintegration, and will not take a carmine stain.

If septicaemia complicates castration the sheath will become obstructed as far as perinaeum. When temperature of affected area falls and pain ceases, we have confirmed gangrene.

Septic gangrene invades suddenly, by leaps, and is a well circumscribed swelling.

Moist gangrene invades slowly, steadily, and is not well circumscribed. The septic vibrio invades an area, causes it to inflame and swell, and consumes its oxygen till the tissue dies. While the tissue is dying, the vibrio makes a fresh invasion of surrounding tissues and its place in the dead tissue is taken by putrefactive germs. The septic vibrio and the putrefactive germ are never together, the former being always in advance in living tissue, the latter occupying dead tissue.

As soon as lymphatics have emptied the septic germs into the blood, a general invasion follows, and is indicated by sudden rise of temperature to 104°-105°. The temp. constantly fluctuates and may suddenly drop 3° or 4°. (The temp. of "surgical fever" is neither so high, nor so fluctuating). The eyes are bright and restless; the animal is irritable and shows fight, the respiration is rapid and labored; the heart is tumultuous, but the pulse is weak; local sweating of ears and flanks, suddenly ceasing; mucous membranes cyanosed; all the lung sounds on auscultation. Dullness, stupor and coma follow in this order, then all these symptoms are repeated. From weakness the animal staggers, perhaps falls.

ANATOMICAL ALTERATIONS:—After death, the body swells rapidly to an enormous size, soon putrefies and emits a very disagreeable, pungent, tenacious odor. Rigor mortis does not take place. The skin crackles under pressure, owing to escape of gases into connective tissue spaces.

The BLOOD does not coagulate firmly, but escapes from the opened vessels as a viscid or waxy, muddy semifluid, exhaling the odor characteristic of septicaemia. On standing, this tarry blood becomes covered with oil globules set free by ammoniacal compounds formed in the putrefying process; the heavier corpuscular constituents settle to the bottom; and the plasma, ordinarily citron-yellowish, is now of a uniform reddish tint from the haematin dissolved out of the red blood corpuscles by the ammonia present. The white corpuscles are numerous, opaque and filled with granules of a fatty nature that resist the action of ether, chloroform and Acetic acid. If autopsy is made several hours after death, we find zoogloea masses and chains of micrococci, as well as bacteria of putrefaction; shrivelled and disintegrated red blood corpuscles.

HEART is hypertrophied, friable, and of a pale "washed-out" color, as though cooked. This condition is pathognomonic of septi-

caemia and Aconite poisoning. Much pericardial serum. Endocardium and pericardium Ecchymotic and thickened, from rupture of small vessels during violent action of heart. If autopsy is made late, the endocardium and intima of large blood vessels will be stained a dark red by the free haematin.

LARGE BLOOD VESSELS are stained, relaxed and friable. The nearer the point of infection, the more liquid, tarry and foetid the blood.

SPLEEN is large, very soft and friable, filled with brownish muddy blood as in charbon. Malpighian bodies a deep violet.

SUPRA RENAL CAPSULES softened as in all parenchymatous diseases.

LIVER large, yellowish and soft, and full of blood.

LUNGS full of same tarry blood, which does not become red on exposure, as does the blood in other diseases, because the septic germs have so altered the haemoglobin that it cannot take up oxygen. Mucous membrane of bronchial tubes may contain red streaks, and the lobes be hepatized and lumpy. A section of lung may show it to be either healthy, or filled with gangrenous areas separated by perfectly healthy tissue. These gangrenous spots may break down and form abscesses containing shreds of lung tissue. Not a true abscess. In pleuro-pneumonia the abscess is surrounded by dense connective tissue.

Pleural cavity contains excess of serum and may be ecchymotic. Mesentery and peritoneum are also congested and ecchymotic.

All lymph glands affected, in charbon only those glands on line of march of the virus. Muscles ecchymotic, flabby and pale, especially the Psoas muscles.

PHYSIOLOGY OF SYMPTOMS:- Two distinct conditions:-

1st. Development of the Septic Vibrio which lives at the expense of the vitality of the individual cells of the tissue in which it is found.

2nd. Action of Putrefactive germ which enters the dead tissue after the septic germ has left.

DIAGNOSIS:- From the oedema, discharge, rapidity of development, etc.

Oedema is not greatest at most dependent point, as is case with other oedemas.

PROGNOSIS:- If fever keeps up, and resists treatment the animal will die. Grave because it resists ~~resists~~ medicinal agents. Not so serious where air is pure, as in country, forests, etc. More die than recover.

TREATMENT:- Local and General.

I. LOCAL:- treat the oedema or surgical erysipelas. Scarify with long deep incisions longitudinal to the limb. Agnew advises cutting away all slough as closely as possible to the sound tissue, and injecting strong sulphuric or nitric acid to act upon the germ. Hocard advises after surgical treatment to apply poultices containing a 5% solution of Carbolic Acid, or White Lotion.

Irrigation with a strong stream of cold water is good. Use clean instruments to puncture with, and do not treat in same stable in which the disease was contracted. Dip lancet in alcohol, and hold it in flame to render aseptic.

Best treatment is subcutaneous injection of a 2-5% solution of Iodine in an aqueous solution of Potass. Iodide.

It produces an oedema which shuts off the lymph spaces from the advance of the germ.

II. GENERAL Treatment:- Quinine, cinchona and iron. Alcohol excellent, because a diffusive stimulant. Tannin said to be good. Stimulate animal with coffee and good food. Carbolic acid advised.

PYAEMIA:- (Purulent infection). A general infection or invasion of the system with purulent material. Called also "Purulent Resorption," "Pyohaemia" etc. Septicaemia and Pyaemia are synonymous, according to Billoth. The lesions are numerous abscesses found in all parts of the body.

ETIOLOGY:- Always have a suppurating wound open to the air. Any open wound is liable to this complication. A suppurative phlebitis of the jugular, following an improper bleeding; compound comminuted fractures, diseases of the feet; suppurative diseases of withers and poll are likely to cause pyaemia. A predisposing cause is the prevalence of the disease.

SYMPTOMS:- General and Local.

I. General Symptoms:- In from 12-24 hours loss of appetite, great depression, chills, muscular tremors, followed by a semi-comatose condition. (In septicaemia the animal is irritable and excited). Animal grunts and groans when forced to move. Mucous membranes dark and congested. Animal seems well one day, but the next is dull.

II. Local symptoms:- A suppurating wound (septicaemia, a fresh wound) covered with large, flabby, red, easily bleeding granulations, and suddenly changing from the discharge of laudable pus, to a scanty flow of "ichorous" pus. Animal rapidly loses flesh, hair is dry and staring, flanks drop in and abdominal muscles relax and animal becomes pot-bellied. Temperature may suddenly rise to 106° or 107° F.; Respiration increases to 40 or 50 per minute; and in 2-3 days a nasal discharge, at first albuminous and slimy, and later rusty, purulent and ill-smelling.

Auscultation gives respiratory murmur increased in some places and lost at others. Percussion give dullness over small points corresponding to abscesses (Hazelnut). Small mucous rales heard when animal coughs. Heart increases in rate, force and loudness; but in same proportion the pulse grows weaker, till it may be lost in the smaller vessels.

When disease becomes general we may notice a sudden and intense lameness from abscess in an articulation; or jaundice from abscess of liver; urine may contain albumen or pus, or be suddenly suppressed from abscess in kidneys. The purulent discharge from nose may contain lumps of necrotic tissue. Temp. suddenly drops 2°-3° below normal. No oedematous infiltration accompanies pyaemia as in septicaemia, the disease does not advance by "leaps" and "bounds," nor so rapidly as in septicaemia; nor does it travel by the lymphatics, but by the veins. Heart and pulse the same in each disease; viz:- pulse in inverse ratio to heart's action.

PATHOLOGICAL ANATOMY:- Pleura congested by continuity of structure with lungs. Lungs much increased in size and weight, lumpy, and lumps from violet to a red color- the superficial, violet, the deep, reddish. They vary in size from walnut to an apple. Lung may float or sink in water according to number of lumps. Hemorrhagic infarct of lung is indicated by dirty white, brown or black areas.

A brownish indurated mass in the lungs is a newer formation than abscess, and unless animal lives some days after the invasion, you will only find these brown masses, called "green abscesses." In septicaemia you find a mass of broken down lung tissue. The lung tissue in pyaemia is normal save in the "masses," while in septicaemia a whole lung may be a dead mass of a tarry color.

ARTICULATIONS:- Synovial fringes hypertrophied; synovia clouded; beginning of ulceration and desquamation of cartilages. Tendons rarely undergo change. Pericardium and endocardium affected as in septicaemia, but no staining occurs.

DIAGNOSIS:- easy from symptoms.

PROGNOSIS:- About 3% recover.

THEORIES as to cause of Pyaemia.

1. "Absorption theory" claimed a purulent metastasis from the wound into the parenchyma of whole system.

2. Marshall, Bernard and Cuvillier said pyaemia was due to suppurative phlebitis in the wound.

3. Another theory was that pus was absorbed from surface of wound by lymphatics, and carried through system.

4. Virchow attributed pyaemia to emboli of coagulated blood, along with pus, becoming lodged in parenchyma of lung and producing an infarct. The emboli arise from larger blood clots (from a suppurative phlebitis in the wound) which are crushed to pieces in passing through the right heart. Virchow injected cabbage seeds into the jugular and produced the lesions of pyaemia. Pus injected into general circulation gives same lesions, except it be first heated, when it is harmless. When unboiled and 5.c.c. injected into circ. of horse it produces pyaemia 7 out of 9 times; less often in the dog. The characteristic "green abscess" results.

5. Pasteur says pyaemia is due to bacilli found in the pus, and not to mechanical action of the emboli. This he proves by killing the bacilli in clots and inject the clots into circulation, when no pyaemia results.

TREATMENT:- Almost none beyond a general stimulant treatment. About 97% of cases will die.

NECROSIS:- is a disease of bone tissue, and is the counter-part of Dry Gangrene of soft tissue. "Decay" is a disease of bone, and is the counter-part of Moist Gangrene of soft tissue. "Caries" is a necrosis occurring in the teeth.

Caries or necrosis has not the same significance in Veterinary Surg. that it has in Human Surg. In the latter necrosis is the same as Osteo-myelitis, and occurs under certain diathetical conditions such as are present in Scrofula (Latent tuberculosis), in which the elements of all tissues have but little vitality. But necrosis in Vet. Surgery indicates a slow local death of hard tissue due to arrest of circulation. The circulation, arrested through disease or accident, does not nourish the part, and it dies. Necrosis occurs when periosteum is torn away from bone; the vessels entering the bone from the periosteum are severed, and bone dies from lack of nutrition. The elimination of dead tissue is the same in all tissues, except in the time requisite for the process. In the treatment we scrape away all necrotic bone till blood oozes

through, and thus convert a complicated into a simple wound.

ALTERATIONS:- Bone is laid down around bone cells called "osteophytes." If vitality of osteophytes is reduced or latent, a slight irritation stimulates them. In the marrow of bone and in Haversian canals are small medulla cells resembling embryonal cells, and large compound cells or "myeloplaxes." The myeloplaxes under irritation separate into many embryonal cells. The medulla cells may contain much fat, but under inflam. they consume this fat and return to their original embryonal form. In inflam. the Haversian canals dilate and may coalesce, through the dissolving of lime salts in the inflammatory exudate.

DIAGNOSIS:- Easy. The dead bone is of a grayish, slaty color, and gives a "gritty" sensation under the probe. The necrosed bone is dry. Usually, a narrow fistulous tract leads down to the necrosing point of bone; and pus is produced by the living tissue irritated by the sequestrum of necrosed bone. We may feel the movable sequestrum with a probe. The odor is characteristic.

PROGNOSIS:- As a rule not serious. Limitation and elimination of slough always takes place. May acquire gravity by involving an articulation.

TREATMENT:- Simple. If there is heat, pain and pus present, open the tract and with sage knife, hoof-knife, curette, or chisel and mallet remove all necrotic bone till blood oozes from normal bone. We thus make a granulating wound. Obtain perfect drainage, and keep the wound perfectly clean.

Nocard advises the injection of such a stimulating liquid as Villate's Sol. or Tincture of Iodine into the fistulous tracts to hasten formation of granulation tissue. This is usually unnecessary. Necrosis is especially dangerous in regions where we cannot easily apply an impervious dressing, and where drainage is poor, as on withers, poll and back.

A 2% solution of H_2SO_4 does not injure living tissue, but will dissolve spicules of dead bone when injected into compound fractures. In ordinary cases of necrosis inject a 2% solution of H_2SO_4 , and dress as usual. Bone that has been bared by injury wash with Potass, Permang, and dress with the Sulphuric acid.

OSTEOMYELITIS:- (decay of bone) is a moist gangrene of hard tissue. It attacks spongy parts of bone; but may only attack compact bone; and extends rapidly.

TWO KINDS; Superficial and Deep Osteomyelitis.

SUPERFICIAL DECAY may accompany necrosis in the same bone. Os pedis most often affected. As a result of injury pus is formed, and being unable to escape from the horny box, induces a mortification of the superficial layers of the bone. The 3rd. phalanx has no true periosteum. Superficial decay is of a deep brown color. When incised, the decayed bone resists irregularly; the hard points being bone surrounded by easily bleeding granulations. These islands of bone are dry, crush easily, and are separated by granulations and pus, the whole forming a curious mixture. A section of such tissue shows irregular lines of dark, marbled tissue, more or less wide, and surrounding yellowish, grayish or greenish spots.

These dark marbled bands become lighter in color (reddish), and the enclosed spots smaller in area and yellowish-green as the section approaches the normal tissue. Normal bone is pinkish in color. Odor of decaying bone is foetid and characteristic.

DEEP DECAY (Osteomyelitis) is more serious than superficial decay, develops more rapidly, and may invade entire 3rd. phalanx in a few days or even hours. It calls for immediate operation, no matter what circumstances oppose. From surface of bone flows a greenish liquid, foetid and unmixed with blood. The bone is uniform in color, both on surface and in deep layers. The greenish liquid is serous pus. An abscess may occur in the spongy bone and extend and involve both the nutritive vessels and the compact bone. The spongy bone then becomes so brittle that the animal's weight may crush it. A section of decaying bone shows bloodless islands of green tissue. The gradual and continuous extension of decay is characteristic; more rapid in spongy bone. Pus is always present, though not the actual cause of decay; nor does the presence of pus prove that invading gangrene is present. An infectious germ is said by latest writers to cause this disease. The pus acts as a vehicle for the germ. Superficial decay does not extend into cancellated bone, is self limited, and thrown off by formation of granulations about the dead bone. Cicatrization then follows, as after moist gang. of soft tissues.

ALTERATIONS:- In filtration of areolar spaces of bone with pus, absorption of lime salts, etc., as already described.

ETIOLOGY:- Local in Vet. practice. Contusions, penetrating wounds, abscesses in the bone, complications of wounds, etc., are causes. A complication of fistulous poll and withers.

DIAGNOSIS:- Easy from symptoms, Sudden and rapid development, pain, swelling and complete loss of function. No tendency to heal. Bone becomes very soft.

PROGNOSIS:- Unfavorable, because of rapidity of development. Not easy to diagnose in time. Purulent infection is a common complication of this disease, and death the ultimate termination when left to itself.

TREATMENT:- Entirely surgical. At earliest moment remove all diseased tissue, and follow with some dressing that will maintain a 2% solution of H_2SO_4 in constant contact with the bone. General stimulant treatment if pyaemia results.

HERNIAS; INGUINAL, VENTRAL, EVENTRATION, DIAPHRAGMATIC, UMBILICAL.

HERNIA:- (Greek "ernos," a bud) is a term which old writers applied to all tumors or lumps. As now used it means "the escape of any organ from its normal cavity, through an opening which may be natural or artificial, into a cavity which may be natural or artificial." Hernias of abdominal organs, notably the intestines, are most frequent; though there are also hernias of the brain, lungs, heart, uterus, etc. It is not necessary for an intestine to escape from the abdominal cavity to constitute a hernia. Hernia is usually dangerous because the orifice of escape is small and produces strangulation by compression. In the case of a loop of intestine which has escaped into the scrotum, for instance, the slight pressure of the inguinal ring upon the thin walls of the intestine is sufficient to arrest circulation in the veins of this part of the intestine, so that though blood can go to the strangulated loop none can come away. Stasis occurs and tends to fix the hernia in place. Alimentary matters, particularly liquids pass down into the dependent loop, increase its size and weight, cause colics and render its reduction still more difficult. The constriction prevents peristalsis; stops passage of food and blood, and if unrelieved causes gangrene in the strangulated loop.

Hernia of lung may occur through walls of chest when ribs are fractured and thoracic muscles torn through.

Hernia of brain follows trephining of cranium, or certain fractures. It protrudes from the cranial orifice because the internal pressure upon the brain is about 23 lbs. per sq. inch, and the external (atmospheric) pressure only 14.7 lbs.

The usual seat of hernia is through the abdominal walls, which are weak and contain several openings or weak spots through which the movable organs of this cavity may easily pass. Abdominal walls are six in number:- Anterior (diaphragm), posterior, superior, two lateral and an inferior. The posterior is free, and there may occur a prolapsus of rectum or uterus. The lateral faces oppose hernias, but traumatism here may give rise to them. Inferior face contains umbilical opening, which for 2-3 months after birth is filled by the "jelly of Wharton" and may admit small intestine, floating colon, or portion of omentum. It may be kept from ultimately closing by some organ settling into it. Farther back on this inferior wall we find the orifice of the inguinal canal. This sheath contains the "testicular cord" of vein, artery, nerve and lymphatics. The canal has two extremities and two faces. The antero-internal face is composed of Small Oblique muscle; the postero-external face is formed by crural aponeurosis and muscles. The superior opening has two lips:- anterior lip is formed by inferior border of Small Oblique muscle; and posterior lip by the superior border of Crural aponeurosis (Poupart's ligament). This posterior lip is inextensible, while the anterior lip is soft and extensible. Commissures unite the lips. Muscular relaxation of the anterior lip occurs in summer, renders this orifice more or less patulous and favors hernia. The inferior orifice is wider than the superior.

The Anterior wall of the abdominal cavity (diaphragm) is of soft easily ruptured muscle, and of elastic fibres. A fall when the stomach is distended with food may cause stomach, liver, pancreas, spleen or small intestine to pass through the dilated oesophageal opening of the diaphragm into the thorax. The opening where the posterior Vena Cava passes through is small and covered by the liver, and rarely allows hernia to occur there. Rupture of diaphragm may occur elsewhere. Oesophageal hernia does not always cause inconvenience.

CLASSIFICATION of hernias:-

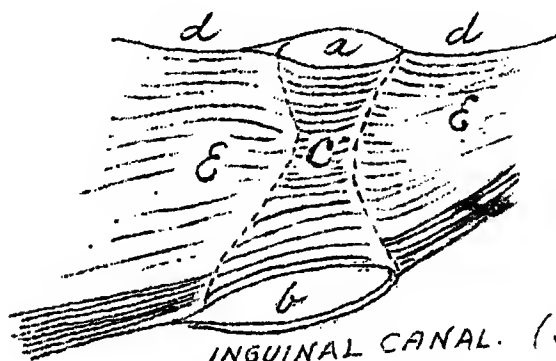
Enterocoele is a hernia of intestine; Omentocoele is hernia of omentum; Thepatocoele of liver; Splenocele of spleen, etc., the name depending on the herniated organ. Or the name may indicate the point of escape, as; Inguinal, Umbilical, Ventral, etc. without indicating the organ herniated.

Usually, the herniated organ is covered by the serous membrane lining its natural cavity, i.e. peritoneum, pleura, dura mater, etc. but if the organ bursts through this serous membrane and comes in contact with the connective tissue, the constant motion of the organ may give rise to a false serous membrane, frequent in old hernias, or inflammatory action may cause adhesions between organ and connective tissue. A hernial cavity may be natural and its opening so patulous as not to interfere with functions of herniated organ. This is often seen in diaphragmatic hernia.

I N G U I N A L H E R N I A .

This form of hernia is produced by the descent of a loop of intestine into the inguinal canal, or even through this canal and into the "vaginal sheath" of the scrotum. In the horse the vaginal sheath has free communication with the abdominal cavity; not so in man. When a horse with a hydrocele is turned on his back, the fluid passes into the abdomen; therefore, to treat such a hydrocele as in man, by injecting Iodine into the vaginal sheath, would be to court death by running the risk of inducing diffuse peritonitis.

We can ascertain the presence of inguinal hernia by introducing one arm into the rectum and carrying the fingers into the superior ring, where they will meet the fingers of the other hand introduced through the lower ring if no hernia is present. If hernia exists a "pasty mass" will be felt between the hands.



INGUINAL CANAL. (See next page.)

(For plan of inguinal region see Minor Surg., page 128).

Strangulation usually occurs at "c" in the figure. The superior ring is usually too small to allow of hernia. The causes of this hernia are predisposing and determining.

INGUINAL CANAL. (See diagram on preceding page.

a. Superior ring. b. Inferior ring. c. Constriction of canal.
d. Poupart's Lig. e. Small Oblique.

PREDISPOSING CAUSES:-

1. Hydrocele, by distending the vaginal sheath.
2. Sarcocele and Chondroma of testicle, by dragging upon the testicular cord which in turn bears down on anterior lip of superior ring causing it to extend and open this ring.
3. Relaxation of Small Oblique muscle by warmth of summer or exercise.
4. Paralysis of muscle (small oblique).

DETERMINING CAUSES:-

1. Raring, and copulating in stallion.
2. Flexing hind legs while confined in stocks.
3. Heavy draft stallions under great muscular strain.
4. Straining in colic.

Left side is most subject because the small intestines are above it.

TOPOGRAPHICAL ANATOMY:- For vessels, nerves, etc. of this region consult an anatomy. Coats of the scrotum may be studied on page 128 Minor Surgery. Only the antero-external part of the inguinal canal is free from vessels, so that any necessary cutting is done at that point.

INGUINAL HERNIA is Acute when sudden; Chronic when of long standing; Reducible or Irreducible; Large or Small.

BUBONOCELE is an inguinal hernia.

OSCHEOCELE is a scrotal hernia.

OMPHALOCELE is an umbilical hernia (Exomphalus).

Inguinal and Scrotal hernias exist in both gelding and mare; lips of mare's vulva correspond to stallion's scrotum and may contain a loop of intestine.

GENERAL SYMPTOMS:- At first obscure. Our attention is drawn by the hurried, shallow respiration; dilated nostrils and eyelids; dull, listless condition of the animal so far as movement is concerned. The facial expression is of pain and anxiety. The flanks are inflated and hard. The maxillary artery is distended, and pulse is quick, frequent and hard as in Peritonitis and other inflammations posterior to the diaphragm. In inflammations anterior to diaphragm pulse is quick, soft and compressible. Sweating at flanks, base of ears, base of tail, and then over entire body. If working, sweat rolls off in streams.

In a few hours the animal will place his feet well under his belly, stamp, paw, throw himself on the ground to ease the colicky pains. He rolls upon his back, and tries to assume and maintain a dorsal position. He may remain 15-20 minutes on his back with his feet resting against the side of the stall. In this position the fluids in the loop of intestine escape into adjacent portions of the bowel, and the belly wall sinks toward the spine, relaxing the mesentery to whose violent extension the pain is due. This traction on the mesentery, and not the constriction about the bowel causes the pain. When colicky pains cease, the horse rises to his feet and swings his head up and down ("increases").

LOCAL SYMPTOMS:- much less marked. Scrotum appears normal in acute hernia, but if it is much distended it is probably a chronic hernia.

Though scrotum appears normal, examination may show the testicle to be high up in posterior part of scrotum and its normal place occupied by intestine. Before treating a stallion for colic, make rectal examination of both inguinal canals for hernia in the manner described at beginning of this article. In inguinal hernia the fingers cannot touch as in normal horse; the cord seems to be thickened (in oscheocele it may be as thick as an arm), though we cannot distinguish one structure from another. Strangulation of the "chord" often increases the size of the tense band that is felt passing into the inguinal canal. The vaginal sac fills with a sero-sanguinous fluid, dark in proportion to age of the hernia. Testicle and scrotal tissues become slightly oedematous by interference with circulation. Per ~~xxxxxxx~~ rectum we can no longer pass two fingers into the superior ring, but may recognize an intestine passing into and coming away from this filled ring. The intestine entering is usually distended by fluids or solids which have been arrested by the constriction; the intestine coming from the ring is empty, and therefore much smaller. Between the two may be felt the taught folds of mesentery passing into the canal.

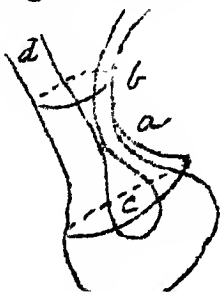
DIAGNOSIS:- Easy by rectal examination, but we may confound Haematocoele, Sarcocoele, Cyst of Epididymus or strangulation of the chord, or even Hydrocele.

Haematocoele is rare without history of direct traumatism; appears suddenly; and at first fluctuates, then crackles under pressure from crushing of blood clots in scrotal cavity. (Macroscopy of large oscheocele is similar). In a few days haematocoele gives sensation of liquid in upper part of scrotum, and is pasty and crepitates in lower part, because serum is above and clot below. Never see dorsal decubitus in colics of haematocoele. Cord and superior ring are normal.

Vaginitis may resemble hernia more than haematocoele does. Inguinal canal is enlarged, but colics are less violent than in hernia, and superior ring is normal. Constriction of the cord is difficult to differentiate from symptoms alone; violent colics, profuse sweating, "incensing" of head, rapid flank movements, and all symptoms of hernia. Rectal examination alone makes differential diag. possible.

PROGNOSIS of strangulated inguinal hernia is grave. Fatal when left to itself. Fair chance of cure up to 12th. hour after strangulation; after 20 hours it is fatal. Trasbeau saw a case recover after 26 hours, but probably there was not complete strangulation.

ANATOMICAL ALTERATIONS:- Those of strangulation, in cases that die of hernia. Strangulation at narrow part of inguinal canal was demonstrated by Bouley. He made an opening in the flank and passed a loop of intestine into the canal. Reddish serous liquid filling the vaginal sac. Chord and intestine congested and oedematous. Mortification occurs later in cord than in intestine when they are equally strangulated because the chord is less vascular. If strangulation is of long standing the gut will be black, soft and flabby (gangrenous) and operation useless.



The accompanying figure shows why liquids may enter but not escape from the strangulated loop. At the point "a" the gut makes a sudden sharp bend and is closed by pressure of the ring, while the other limb "d" of the loop is straight, and allows liquids to pass in. "b" is upper ring, and "c" lower ring.

TREATMENT:- Two kinds, Manipulation (taxis), and Operation.

MANIPULATION when hernia first appears; easy to reduce, and results are good. To practice taxis, place animal in dorsal position; trim finger nails and introduce the soaped or oiled arm into rectum, and get both ends of the loop in the grasp and make slight traction. With other hand at external ring make gentle taxis and in a few minutes the hernia disappears and nothing but the patulous inner ring can be felt. This method works well on a hernia of a very few hours standing, but is useless after 8 or 10 hours. Then the intestine has become so congested as to be soft and easily torn. This must be remembered. Belladonna ointment is useless for relaxing the inguinal region.

OPERATION:- if hernia is 6-8 hours old. Place animal in dorsal position. Between the cannons of the hind legs place a piece of board notched at the ends and about 4 ft. long to keep the legs well apart. Pad the ends of this brace to prevent excoriation. Another method of holding legs apart when animal is cast on the sound side is to use two side lines; one attached to the cannon of hind leg on affected side and fastened to a stationary object at right angles to the long axis of the horse so as to abduct the leg strongly, the other running forward from the same cannon and tied to keep the animal from carrying his leg backward (kicking). Either method may be used in all operations on this region.

Anaesthetize with Chloroform, it is safe and acts quicker than ether. Place 3/4 ss on a pad of oakum and hold near upper nostril, leaving lower nostril free. As soon as first exhilaration wears off, put pad in nostril, and measure out 3/4 ss at a time till anaesthesia is produced when the chloroform should be withdrawn. Watch pulse and respiration.

1st. STAGE. Incise skin and dartos to tunica vaginitis, the assistant stretching the skin transversely. Dissect out the vaginal sheath from the dartos, as high up as possible, using the fingers. Pinch up a fold of vaginal tunic and nick it, being careful not to wound the intestine underneath. If intestine is wounded, peritonitis may kill the animal in 24-60 hours. With grooved director or scissors cut slit in vaginal tunic. A serous liquid, dark in proportion to age of the hernia will escape. If hernia only 2-3 hours old, serum will be light pinkish; if 12-13 hours old, serum will be dark red, or blackish. The testicular cord will be swollen and the loop of intestine dark red, or violet. Introduce finger into vaginal sheath and down as near the constriction of inguinal canal as possible. Pass a "herniatome" in upon this finger with its cutting edge toward the external commissure of the canal till it passes well within the neck of the canal. Then turn the edge toward the antero-external wall of canal and press gently. This part of the wall is free from vessels.

2nd. STAGE. Reduce the hernia by taxis per rectum, the assistant stretching the vaginal sac and smoothing out the peritoneum so that intestine may glide into abdominal cavity.

3rd. STAGE. Place a curved clamp as high up as possible on vaginal sheath and testicular cord and cut off what remains below. Leave clamp on till it sloughs off.

If we wish to save the testicle (valuable stallion) a special operation must be done.

It consists in cutting the constriction in the inguinal canal from without. Make incision high up toward lower ring through skin and dartos to vaginal sheath. Pass herniatome between dartos and vaginal sheath to constriction of canal and cut as before. In this operation the sac is not opened. Close wound with silk sutures, and dust with Iodoform.

Another operation where testicle is to be sacrificed, but the ring not incised is as follows:- do the uncovered operation cutting the testicle away just above the epididymus and tying a string tightly to end of the testicular cord. Now per rectum draw the swollen cord into abdominal cavity keeping the end of the string in the hand. When the large oedematous cord is drawn out of the canal the intestine will usually slip into the abdomen. The testicular cord is then drawn down into its normal place by means of the string, and a clamp applied to cord and sheath and left to slough off.

If the canal is so patulous that subsequent hernia is feared, twist the cord so as to cause it to grow shorter and thicker and thus occlude the superior ring. Now clamp it and vaginal sheath, and allow clamp to slough off.

AFTER TREATMENT:- Feed no solid food for 14 days. Give milk, or oatmeal, flaxseed or other grain broths. Sometimes after 6-8 days symptoms of acute Peritonitis suddenly arise and indicate that the intestine has softened and ruptured, and contents escaped into abdominal cavity. The operation in such a case was done too late. Even when operation is a success the animal may not completely recover.

CHRONIC INGUINAL HERNIA:- The loop of intestine may fill with faecal matter, become partially strangulated and give rise to dull colics. movement of animal is interfered with.

ETIOLOGY:- Anything that tends to dilate the inguinal canal, particularly the superior ring.

1. A neoplasm of the testicle causes chord to drag continually upon the anterior lip of the superior ring, dilating it without rupturing any of its fibres.

2. Chronic hydrocele, amounting sometimes to 10 or 12 quarts, tends to dilate the whole canal.

3. A "scirrhus cord" dilates the canal and favors hernia.

4. In cryptorchids the growth of the testicle in the superior ring dilates it, and castration is followed in a large percentage of cases by the descent of a knuckle of bowel into the canal. Examine the ring in such cases before casting.

5. Violent exercise, in some manner not understood, may force intestine into the canal and so dilate it as to cause chronic hernia.

Sarcocele and chondroma of testicle are the most common "neoplasms" of that organ.

SYMPTOMS:- A large tumor in the scrotum, of a compressible, pasty consistency, painless and varying in size from hour to hour. It may be larger just after feeding, and may be reduced in size by manipulation. There is usually oedema of scrotum on both sound and affected side, and more or less serum in the vaginal sac (partial hydrocele). The tumor of the scrotum may reach forward to the xyphoid cartilage, or below to the hock. By rectal examination we find that the cord on sound side grows smaller as it passes down toward the superior ring, while the other cord increases in size

from superior ring down to scrotum. The superior ring after reduction of hernia may admit three fingers or even the whole hand.

If the hernia resulted from a laceration of the superior ring, there are usually false membranes between intestine and ring, which prevent reduction of the hernia. The intestine is therefore, bound down at that point, its peristalsis destroyed, and it is converted into a passive channel, in which food stops and impaction frequently occurs. Colicky pains, less acute than those of acute hernia, accompany the impaction. The animal lies down and gets up carefully, and is dull and depressed as in impaction. These symptoms may last 3-4 days and then disappear, or terminate in strangulation. Feeding and work both influence the size of the tumor.

DIAGNOSIS:- Easy from symptoms, and a rectal examination. Always make a rectal examination. Hydrocele and hernia disappear when animal placed in dorsal position. Hernia may be bound by adhesions to ring. Sarcocoele increases size and weight of the testicle and may accompany hernia. Hydrocele may also accompany hernia. May be a slight vaginitis with the hernia. Diagnosis is made on consistency, fluctuation in size, and disappearance on manipulation of the tumor; the patulous superior ring, colicky pains, etc.

PROGNOSIS:- Serious, because persistent. Often necessary to castrate, and this diminishes animal's value. A ligature may cure the hernia in early stages; but when old the canal is dilated, the intestine may adhere to vaginal walls, and the scrotum is much thickened and indurated, so that operation is most difficult. Wall of intestine may be distended by reason of frequent impactions. If much strangulation exists the walls are thick, congested, reddened, and vaginal sac contains bloody serum. If recently formed false membranes are present they separate easily, but if well organized are tough, look like dense fibrous tissue, and solidly unite intestine to ring or scrotum.

TREATMENT:- If simple, by taxis per rectum on the recumbent or standing animal. The hernia tends to return on slight provocation. Operate as in Acute Hernia. We may twist the cord from 1-4 times and it will become thicker, slightly oedematous, and will adhere to sides of canal, and often obliterate the superior ring.

If adhesions exist, operate as for strangulated inguinal hernia. Cut down on intestine carefully, remove testicle, dissect intestine from surrounding parts by scissors or fingers, and reduce the hernia. Further treatment is same as for Chronic Hernia without adhesions.

Nocard advises local anaesthesia by ether spray in operations on scrotum of stallions. He reduces the hernia, pushes the testicle as far up into scrotum as possible, and places a whip cord ligature on the scrotum below the testicle, making it tight enough to produce much irritation and large oedema, but not tight enough to strangulate and cause sloughing. Inflammatory adhesions follow, and the testicle fills the lower ring, preventing, for a time at least, return of intestine to vaginal sac. Irrigation and punctures relieve the oedema. By this method the testicle may often be spared.

In "geldings" a form of chronic hernia occurs, different from that of entire horses. Before castration a loop of intestine may pass through a laceration at superior ring and separate the vaginal tunic from the dartos.

Ultimately the hernia contains much intestine and is always outside of tunica vaginalis. It is recognized as a soft, fluctuating mass, covered by raised skin and showing vermicular (intestinal) movements. The treatment is nil, as we cannot fill up the inguinal canal and prevent return of bowel. Apply a clamp, after reduction of hernia, and get as much adhesion as possible.

V E N T R A L H E R N I A .

An escape of an abdominal organ through an opening in abdominal wall. The abdominal muscles rupture, and only the skin resists the traumatism, and prevents an eventration.

CAUSES:- Blows, traumatisms may rupture the muscles, but not break the tough elastic skin. Common among horned cattle, and horses pastured with cattle.

SYMPTOMS:- Soon after the traumatism a soft, pasty, reducible tumor, sensitive in proportion to the force of the contusion. We can reduce the tumor by pressure, and then feel the edges of the abdominal muscle about the rupture. Rectal examination of no importance.

After 24 hours, symptoms are exaggerated. At point of laceration a hemorrhage, in size depending on number of vessels compromised occurs, and we get a sensation of a hard crepitating tumor, the soft pasty tumor having disappeared. This haematoma masks the opening. In 36 hours there is a painful oedematous swelling, and the animal acts on the offensive. Do not confound it with abscess. There may be intense inflammation, great inflammatory transudate into the tissues, and sometimes pus forms near the skin. When pus is recognized, let it escape. Always suspect hernia when you see a tumor, or apparent abscess in this region. Evacuate pus through smallest possible opening and prevent eventration. Treat all such tumors as hernias till that theory is disproved. By applying hand to tumor, the vermicular movement of intestine can be recognized if intestine is present. On auscultation two sounds are heard, one in the tumor, the other deep in abdomen. In from 7-14 days inflam. ceases, oedema is absorbed, and a ring of indurated connective tissue is found around the rupture. Animal may have slight colicky pains from local inflam., and digestive disturbances, but they disappear on rest. Exercise may cause the hernia to again appear, and pain may be so severe as to lead us to suspect strangulation of the intestine, though this is rare.

DIAGNOSIS:- Easy at first, but after 24-36 hours the tumor simulates a haematoma, as indeed it then is. The treatment, however, is the same for both. In 2-3 days inflam. develops and the tumor may be confounded with deep abscess. A deep abscess in this region must be opened immediately, or it may burst the thin abdominal wall, and escape with fatal consequences into peritoneal cavity. If an abscess, give a vent to the pus; contra-indicated in hernia.

DIFFERENTIAL DIAGNOSIS:- Easy at first. By manipulation vermicular movement can be felt. Auscultation reveals gases and liquids in the tumor up to about 18-24 hours after the accident. Use a capillary trocar to examine for abscess, and puncture in centre of tumor. Use rotary motion and gradual pressure. If an abscess, pus will flow when stylet is removed, or can be seen in end of cannula; while if the trocar is in an intestine, gases or alimentary substances will escape. From a haematoma nothing except possibly

a little bloody serum will escape.

PROGNOSIS:- Serious, because often incurable. If we can feel the fibrous pad, apply a bandage and the hernia will disappear, but may return a few days after bandage is removed. Size and shape of opening is of importance. The round openings are not easily closed, and seldom produce colic because there is no strangulation. In the oval or elliptical openings strangulation is more apt to occur, and moreover, the sides are more easily brought in contact. Gradual distension of the skin may allow tumor to become so large as to interfere with or wholly prevent use of an animal.

ANATOM. LESIONS:- A rupture in muscular walls beneath the skin. Lips of rupture ecchymotic. Usually the peritoneum being tough and movable is pushed before the object causing the wound and is not ruptured. In this case peritoneum lines the hernial sac, i.e. lies between the intestine and the ruptured muscle. Sometimes peritoneum is ruptured, then intestine escapes through peritoneum and lies in contact with connective tissue of skin and muscle. Here its constant vermicular motion causes formation of a false serous membrane; or else adhesions form between gut and wall, peristalsis is interfered with, and impactions and dull colics result.

TREATMENT:- According to size, shape and age of wound. At first, reduce the hernia; may be necessary to put animal in dorsal position. Be sure the intestine does not remain between skin and wall of abdomen. Allay inflammation and prevent transudate and extravasation of blood, and possible formation of pus, by continuous cold irrigation, lotions, shower-baths, or by what is best- a poultice of cracked ice mixed with bran.

Get in readiness oakum; splints of cork, shingle or thick sole-leather sufficiently wide and long to cover and extend beyond edges of the rupture; strips of strong muslin bandage, varying in size from 2 by 12 inches to 6 by 48 inches; some glutinous substance, the best being one part of shoemaker's wax melted with 4 parts of oil of turpentine. The latter lowers the melting point of the wax so that it will not burn the skin when applied.

By manipulation be sure that hernia is reduced. Dip the short narrow strips of muslin into the melted wax and apply tightly over the point of rupture. These strips are to be parallel, each overlapping the preceding by $1/2$, and extending well beyond edge of the wound. Above these apply a second layer of longer and wider strips at right angles to the first layer, each always overlapping the preceding by one-half. If now the rupture be large and protrusion marked, we may assist these two layers in keeping the hernia in place by putting above them a stiff wide splint and a pad of oakum just over the area of rupture and binding them firmly down by successive layers of bandage, each longer and wider than the one under it, and placed so that the strips cross those of the preceding layer at an acute angle. If the hernia is large and in the floor of the abdomen, some of the strips should pass completely around the body and overlap about one foot. Place a pad of oakum or rye straw on each side of the spine to keep bandage from pressing on superior spinous processes and causing sloughing of skin.

Put animal at rest and feed nourishing, laxative, easily digested food that has little bulk and weight. We wish to lighten and contract the intestines. Oatmeal and bran in drinking water, "shorts," etc., are good. Continue such feeding for 4 or 5 days, till a ring of fibrous tissue begins to form about the wound.

After 4-5 days the bandage treatment does little or no good. If the hernia enlarges during work, apply a clamp or ligature. The cicatricial tissue that forms after the slough, may gradually distend under pressure of the organ within, and the hernia return in 2 or 3 months. If adhesions prevent reduction, open the sac and dissect the intestine from the sac and return it to the abdominal cavity. Whenever the rupture is much longer than wide (5 or 6 inches by 2.), chronic, and the animal unable to work we should operate, but not if the wound is large and circular. Cast, incise skin over tumor, and freshen edges of wall. Place long steel pins through muscular wall and skin, but not through peritoneum, and a "fig. of 8" ligature above will hold them in place. Approximate the skin's edges in same way, and above place the glutinous strips as for ordinary ventral hernia.

E V E N T R A T I O N .

An eventration is a rupture of all the structures of the abdominal wall, allowing the viscera to pass out of the abdominal cavity. Rare, and usually traumatic. Caused by horns, hooks, broken shafts, kicks, prongs of forks, etc. Castration by covered operation in standing position of an animal having an unrecognized inguinal or scrotal hernia often results in eventration. Even in dorsal position a hernia may slip back into abdomen and not be noticed. Much better to cast for castration, so that if hernia exist no eventration shall occur.

Eventration in the dog not serious if intestines are washed, returned, and the wound tightly closed. The hernia may be of large or small intestine, omentum or caecum; and the amount escaping depends on size of the orifice, looseness of the mesentery, and the straining done by the animal. The color of the extruded viscera depends on the congestion present, being deep red or violet under intense inflam. or strangulation.

GENERAL SYMPTOMS:- Violent colics, great restlessness. Animal may tramp upon or tear the intestines.

ANATOMICAL LESIONS:- are those associated with compound wounds.

DIAGNOSIS:- Clear from symptoms.

PROGNOSIS:- Serious in the horse, because a fatal Peritonitis usually follows. If the hernia is small, the opening small, and operation immediate, there are some chances of recovery. The condition of the intestine, length of the extrusion, and condition of the animal modifies the prognosis. In an ox we may cleanse a seriously injured intestine that has been out several hours, and return it to its place, close the wound and get complete recovery, because cattle are not very susceptible to peritonitis. The same is true of the dog.

TREATMENT:- First destroy the animal's power to resist our efforts to return the eventrated viscera, by administering an anaesthetic, performing tracheotomy, or otherwise. If a large mass of intestine is protruding, support it in a sheet which has been wetted, folded,

carried under the belly and tied above the spine. This will prevent injury to the viscera in casting. Anaesthetize and place in dorsal position. Wet a sheet and draw it around and under the intestines to keep them from infection. Thoroughly wash them with warm water, and return them by working on the distal end. Sometimes better to work from backwards toward the stomach. Under the muscular relaxation of an anaesthetic no straining and extrusion of viscera can occur to hinder the operator. Trim the finger-nails, work gently and slowly. When the organ is returned, use the most convenient suture. Place a few catgut or silk sutures in the peritoneum and bring it together over the viscera. Use metal sutures, annealed iron wire or silver-wire, to close the muscular walls. Do not use silk or cotton for this purpose. Bring the ends of the sutures out between the edges of the skin. Place a few sutures in the skin. In this way we close the wound after rumenotomy. May now place an antiseptic pad of oakum over the wound and fix it by adhesive straps. This will reinforce the sutures and keep out atmospheric germs. The oakum and bandage are not needed in small animals whose viscera are not heavy. Diet so as to unload the intestines.

D I A P H R A G M A T I C H E R N I A .

An escape of abdominal viscera through an accidental or natural opening in the diaphragm. Rare because position of diaphragm prevents its injury, or escape of viscera through its natural openings.

ETIOLOGY:- Contusions on the hypochondriac region, which is very yielding. Broken ribs may tear the diaphragm and hernia follow. For production of hernia the rupture should be low down, if superior it is not so apt to be followed by hernia. A full stomach followed by violent contraction of the abdominal muscles, as in pulling or straining, or a heavy fall upon the knees or shoulders may rupture the diaphragm, sometimes completely, so that the two cavities are made one. Simple muscular exertion has ruptured the diaphragm, though it is probable that old lesions existed and weakened the organ. A full heavy stomach dragging upon tissues under the oesophageal opening may so dilate the orifice, that contraction of abdominal muscles during violent exertion, will either force a knuckle of small intestine through into the thoracic cavity, or cause a rent downward from the oesophagus. Death may be preceded by the colicky symptoms of partial or complete strangulation of intestine, and yet the autopsy reveal nothing to warrant it, for intestine often slips back into place. The colicky pains, as in inguinal hernia, are developed several hours after eating. If a rupture is old, cicatricial connective tissue will be found around it.

SYMPTOMS:- Vary according to age of lesions and the obstruction to respiration. Immediately after the hernia the respirations may increase in frequency to double or treble the normal, and marked dyspnoea be present. This occurs immediately after a fall, blow, kick or violent exertion. The expiration is labored and jerky, as in neoplasms of the chest. To empty the lungs the animal must employ the muscles used with forced respiration; particularly the

abdominal muscles; and this gives a double expiration, as in emphysema of lungs ("heaves"). The animal at liberty moves slowly in a circle. If turned quickly it will groan, as in pleurisy.

Auscultation shows respiratory murmur decreased or absent at certain points- sometimes over one whole side. Always increased postero-superiorly, because the weight of the abdominal organs herniad causes them to sink to bottom of thorax. Noises due to swallowing of saliva, to respiration, and to peristalsis of intestines are transmitted sharply to the ear as a "vocal fremitus" through the medium of the liquid in the herniad intestine, just as similar noises are transmitted through pleuritic fluid in pleurisy. These noises are greatly increased after meals, especially if much water has been ingested.

Percussion elicits normal or hyper-resonant sound at top of the chest; and at a variable distance below a note of dullness or tympany, depending on presence of water or gases in the intestine. At lowest point of chest the percussion note may be dull, owing to presence of solid organs like the liver. A small loop of intestine may not displace the thoracic organs, but may give a "cracked pot" sound, similar to that heard over old tubercular lesions of the lung. If, when this sound is heard we can exclude Pneumonia, Septicaemia and Tuberculosis, we can diagnose diaphragmatic hernia. From rapid change in contents of individual portions of the intestine, the percussion notes of those portions change *pari passu*. The small intestines are empty of food most of the time, (for food passes through them rapidly), but partially filled with gases which give the "cracked pot" sound.

DIAGNOSIS:- Can be established from the foregoing symptoms.

Acceleration of respiration and pulse, colics, aversion to movement, auscultation and percussion make diagnosis quite certain. Marked quickening of respiration indicates a large rupture, and much viscera in the pleural cavity; while a small rupture is more apt to produce strangulation (with colicky pains) of a small loop of intestine, with little or no influence on respiration. The animal becomes "short of breath" on the least exertion, and stops to recover. In the stall the animal is restless, alternately rises and lies down; may assume the dorsal position as in inguinal hernia.

In congestive colics an animal may lose all sense of self preservation (sometimes also in strangulated hernias). Congestive colics are apt to be intermittent, occurring every 10 or 20 days and disappearing under light purgation and general treatment. However, it is often impossible to make a differential diagnosis.

Colics from diaphragmatic hernia are infrequent; from intestinal congestion frequent, and fatal in 10% of cases.

PROGNOSIS:- Serious, because we cannot reduce the hernia.

TREATMENT:- When colics violent and death threatened, perform gastrotomy and reduce the hernia. Usually fatal (19 out of 20 cases) from peritonitis. In the ox this operation is advisable, because a fatal peritonitis is not likely to follow. Open the flank, withdraw the herniad organ to its proper place, and close the wound as an eversion. In a small horse the reduction has been performed per rectum.

U M B I L I C A L H E R N I A .

An escape of abdominal viscera through the umbilical opening. **SYNONYMS** are:- "Exomphalus" and "Omphalocele," which do not indicate what organs are extruded; "Enteromphalocele," an umbilical hernia of intestine; "Epipomphalocele," an umbilical hernia of omentum.

ETIOLOGY:- Frequent in the horse, rare in the ox. In the horse the small intestine can easily enter the navel, being just above it; but this opening in the ox, sheep and goat is effectually covered by the heavy and voluminous sacculated organ, the stomach, which prevents the intestine entering the umbilicus, even should it be patulous. Habit influences the occurrence of this hernia. Active colts more predisposed than sluggish animals. It is more likely to occur while a colt is living upon the mother's milk, because then the small intestine is active and growing rapidly; while later when herbs are ingested, the large bowel (colon and caecum) takes on activity and growth, and the small intestine is functionally less active. With the increase in size of the large intestine and stomach, an umbilical hernia, if present, gradually disappears (not always) without surgical interference; so that though often seen in colts, horses are rarely affected. This disappearance occurs between the 4th. and 8th. month after birth.

A fall or other traumatism soon after birth, may rupture "Wharton's jelly" and produce this hernia; or forcible contraction of the maternal uterus upon the foetus during labor may distend the umbilical opening and predispose to this hernia. Normally Wharton's jelly cicatrizes, closes the umbilicus and soon nothing but a lozenge shaped appendage remains. But if a loop of intestine at birth or soon after should happen to gain entrance to the umbilicus, natural cicatrization does not take place where it should, but at a distance below the opening in the muscular wall. Here the loop of intestine rests and grows, its movements and increasing weight and volume gradually dilating the umbilicus and stretching the overlying skin till a veritable hernia is formed, which does not pass away.

Hernia may arise through traumatism in colts between the age of 2 and 6 months, by a breaking down of the umbilical cicatrix. This we call a "Ventral Hernia." Heredity is assigned by one writer as a cause. He asserts that in a certain family of horses which he watched for 30 years every colt had umbilical hernia.

SYMPTOMS:- Easily recognized, if uncomplicated. Obscure when a tumefaction at level of umbilicus masks the herniated organ. Ordinarily, a tumefaction from size of hazel-nut to almost any size, of various shapes, increasing after feeding and exercise, soft, pasty and fluctuating; reducible between periods of digestion, both by taxis and by assuming the dorsal position. When reduced, the skin covering the navel is loose, and digital exploration will reveal the opening surrounded by a fibrous ring of a thickness depending on the size and age of the hernia. Vermicular movement and borborygmi (intestinal rumblings) can be recognized.

General symptoms not recognized in a simple case, where passage of intestinal contents is free; but exercise or traumatism may cause a hot, painful inflammatory oedema to develop and lead to the suspicion of deep abscess of this region. In such a case do not thrust a bistoury into the supposed abscess, but explore with a capillary trocar. If an abscess, pus will be found; if an intestine, the contents of that organ will be recognized. Always use care in exploring a tumor of this region.

ANATOMICAL ALTERATIONS:- Simple. From without we find a loose fold of skin, subcutaneous connective tissue, a diverticulum of peritoneum and intestine. Sometimes the intestine passes through the peritoneum, and by constant motion against the subdermal connective tissue converts it into a false endothelial (serous) membrane.

DIAGNOSIS:- Easy from the symptoms, except where they are obliterated by an inflammatory oedema, in which case we must proceed cautiously.

1st. Determine whether or not abscess is present by making a capillary puncture with a trocar. If not abscess, it is probably hernia.

PROGNOSIS:- Not serious, because it usually passes away spontaneously. May persist for 5 or 6 months, or as long as the colt lives on a milk diet. The rational cure is the change to a herbaceous diet, causing a physiological development of the large intestine, as already mentioned. Therefore, never operate till this treatment has proved ineffectual. A small percentage do not get well of themselves. Treat surgically between the 10th. and 12th. month.

Traumatic umbilical hernia of adult animals has some gravity, from the complications that may arise, and from the difficulty in getting proper healing. In France 1/5 of all colts are affected with umbilical hernia, and the annual loss from this cause is about \$600,000.00.

TREATMENT:- Wait till colt is about 12 months old.

There are four groups of treatment:-

- I. Trusses or Bandages, applied after reduction of hernia to prevent return of organ into the hernial sac.
- II. Mechanical means for occlusion of the hernial sac.
- III. All plans and methods for closing the sac by sutures.
- IV. Occlusion of the sac by producing an inflammatory oedema which pushes the herniated organs into the abdominal cavity, and facilitates healing of the opening.

I: BANDAGE METHOD:- The oldest. Much like that followed in ventral hernia. The simplest apparatus is a belt secured about the body by straps, having a conical cushion on the inside which fits into the umbilicus. The objection to this method are twofold:-

- 1st. The bandage is not easily kept in place, because the trunk is conical in shape.
- 2nd. In order to be of any benefit the bandage must be applied so tightly as to seriously interfere with both costal and abdominal respiration. This method has been abandoned.

A better plan, though quite expensive, is to attach the preceding belt and cushion by rubber straps to a long saddle placed on the back. The rubber will allow expansion of chest in respiration, and the saddle will relieve the superior spinous processes of pressure. Both these methods are, however, objectionable.

- II. CLAMP AND LIGATURE METHOD:- Place animal in dorsal position, reduce the hernia, and secure the entire hernial sac between the lips of the clamps so that the intestine cannot return. When the clamp has sloughed off, the cicatricial tissue prevents return of the hernia. First, while the animal is standing clip the hair closely from the umbilical region, and make a distinct mark around the hernia close to the belly, which shall indicate, when the animal is in the dorsal position and the hernial sac is relaxed, just how much skin is to be included within the clamp. After casting and reduction of hernia, the operator makes traction on the sac while the assistant applies the clamp as in the "covered operation." Sloughing is slow in skin, because it is thick, tough and not very vascular; but this is favorable to cicatrization.

Accidents may happen; the irritation of the clamp may cause the animal to remove it with feet or teeth, and an eventration follow.

Clamps, especially long ones, are apt to slip. The greatest pressure is exerted on the skin near the ends of the clamp, and the skin near the middle is apt to be held but loosely, and to slip out from between the bars of the clamp. To obviate this various clamps have been advised. We may cover the ordinary clamp with an apron, or pad of oakum and bandage to protect it from the animal's hoofs and teeth.

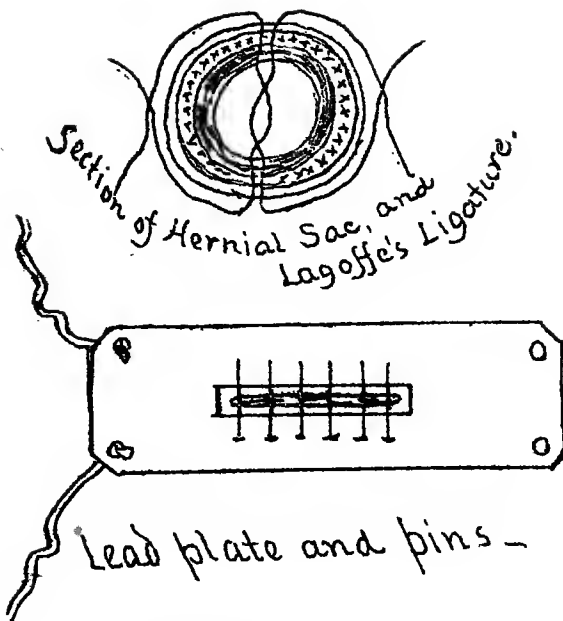
A metal clamp having a hinge between the branches at one end, and a screw at the other for closing the clamp is used by some veterinarians, but is objectionable because it exerts much greater pressure near the hinge than anywhere else, and here sloughing occurs too rapidly for cicatrization.

A better metal clamp has a screw at each end, and small "cusps" which are received into corresponding sockets along the inner edges of the branches, to secure a firm hold upon the skin.

Another metal clamp consists of two rods, corrugated to prevent slipping, and approximated by a thumb-screw at each end, by which the pressure can be regulated as desired. Clamps are objectionable, dangerous, very painful when applied to the skin, and have caused tetanus. Do not use them if you can help doing so.

In applying a ligature to the skin, nick the skin in places to allow the ligature to come in contact with the subcutaneous connective tissue.

- III. SUTURE METHOD:- Long used, and in most favor to-day. Lagoffe's ligature, though open to some objections, will not slip, and has many advocates. The hair is clipped from the sac and a stout cord ligature is applied as indicated in the diagram. This ligature does not give the best results.



A clamp that gives very good results as a compress in connection with the suture method is made of plate lead, with a slot through which the hernial sac is drawn and transfixed with steel pins crossing the slot. Through holes at the corners of the lead plate bandages are passed to aid in supporting and fixing it. The weight of the plate is objectionable, but the results are very good. A sheet of zinc may be used instead of lead.

Bernard applied long straight billed forceps to the sac, and placed ordinary harness sutures on the outside; the forceps holding the intestines out of harm from the needle. Heavy pin or quill sutures are the best. Metallic quills are also used, the sutures being of steel

about the size of the stylet of a trocar and having a trocar point. These steel pins are passed through the tissues of the hernial sac and screwed into holes in the metallic quills. The quills are brought together with thumb-screws.

IV. CAUSTICS:- The best is Acetic Acid. The slough comes away in 25-30 days and leaves a strong, well formed cicatrix. One application will make an oedema sufficient for 6-8 weeks. If a second application be made soon after the first the acid will act upon the peritoneum or intestines and do harm. Make the second application about 6 weeks after the first, and a slough (often hard and dry) will soon come away.

Potassium Bichromate- 12 grains to 50. of lard; rubbed into the shaven skin till a profound action is obtained, is good treatment. Out of 90 cases so treated by one practitioner, 75 were cured, 10 had to be retreated, and 5 were incurable.

The latest treatment is the subcutaneous injection into the connective tissues of a strong solution of common salt (Na Cl.) It causes an enormous oedema, lasting 5 or 6 weeks, which forces the intestines back and closes the opening. It produces no slough, and much cicatricial tissue.

Mustard will do the same, but if care be ~~xxx~~ not used, will produce a quick and dangerous slough.

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Chapter VII.

PURULENT COLLECTIONS IN GUTTURAL POUCHES AND SINUSES.

GUTTURAL POUCHES:- ANATOMY. "The mucous membrane lining the Eustachian tube is continuous, forward, with that of the pharynx; above and behind, it is prolonged into the tympanic cavity, which it lines. Below, it is dilated and forms the guttural pouch."

"Two in number, one on each side, these pouches lie against each other in the median plane, and descend to the larynx where

they end in a cul-de-sac. Before and behind, they extend from anterior part of pharynx to inferior face of atlas. Capacity of each though quite variable may be said to be about $\frac{3}{4}$ of a pint.

"RELATIONS:- Behind and above to base of occipital and sphenoid bones.

"Inferiorly, when distended, it descends on lateral portions of larynx and pharynx to lower end of parotid gland.

"Externally:- (a) In intermaxillary region it is in relation with the tensor palati, pterygoideus and hyo-pharyngeus muscles and with internal maxillary artery and lingual nerve. It envelopes the large branch of hyoid bone, and covers internal face of internal pterygoid muscle.

(b) "In parotideal region the pouch responds, above, to inner face of parotid gland, from which it is separated by auricular vessels and nerves; a little lower, at posterior angle of hyoid bone, to stylo-hyoideus muscle and styloid process of occipital bone; here the auricular artery passes obliquely upwards and backwards. Still lower the pouch responds to stylo-maxillaris muscle, external carotid, ninth and twelfth pairs and great sympathetic nerves.

(c) "Posteriorly it is in relation with the atlas, flexors of head, and occipital artery; it forms a fold that envelopes the pneumogastric and sympathetic nerves, and anteriorly a second fold enclosing the internal carotid.

"The guttural pouches communicate with the pharynx and tympanum and are supposed to assist hearing in some way. The Eustachian tubes of which these pouches are diverticula assist hearing by equalizing the pressure of the air on both sides of the tympanum. The guttural pouches exist only in solipeds.

ETIOLOGY OF COLLECTION IN POUCHES:-

1. Rhino-adenitis (Strangles or Colt distemper). Chief.
2. Pharyngitis.
3. Diphtheritic conditions, etc. Pneumonia may be associated, and the lymphatic ganglia are usually involved. In rhino-adenitis the mucous memb. of the pouch is irritated and the suppurative infla. which follows fills the pouch with pus; it is thus not a true abscess.

SYMPTOMS:-

1. Intermittent discharge of smooth, bland, creamy pus from lower commissure of one or both nostrils. Discharge greatest when drinking or eating, because act of swallowing compresses pouches and forces their contents out. Pus from sinuses is flocculent. Pus of glanders is thin, oily, perhaps blood-streaks and adheres all about the nostril.
2. Submaxillary glands swollen, hard, hot, painful, non-adherent to the skin or bone. The gland as a whole is lobulated.
3. Distension of middle and lower parotid region if the pouch is very full. Subparotid abscess appears higher up near base of the ear.
4. May be rejection of food, irregular, difficult respiration or an imminent asphyxia.

TREATMENT:- HYOVERTEBROTOMY. The pouch is punctured where it covers the stylo-hyoideus muscle, and a drainage tube passed through the fundus of the sac and out at the angle of lower jaw.

TOPOGRAPHICAL ANATOMY of the operation.

Three Layers:- 1. Superficial. 2. Median. 3. Deep.

1. Skin and subcutaneous connective tissue, parotido-auricularis and parotid gland. The gland is flattened and molded to the space posterior to lower jaw. It is strongly fixed at either end; but is loose and easily raised in its middle third. It contains the jugular vein and occipital branch of the facial nerve and posterior auricular nerve.

2. Median layer comprises the tendon common to the splenius and complexi muscles; the posterior auricular artery which descends parallel to the styloid branch of the hyoid bone.

3. Deep layer comprises the postero-superior tuberosity of the styloid bone which yields under pressure of the finger; above and backwards the unyielding styloid process of the occipital bone; between these bones the thin, triangular occipito-styloid muscle and in a fold of mucous membrane the internal carotid artery. The pneumogastric, hypoglossal and glossopharyngeal nerves all lie oblique to the internal carotid artery. The maxillo-muscular artery is given off where the external carotid artery crosses externally the styloid bone.

HYOVERTEBROTOMY:- Instruments. Curved scissors, curved and straight bistouries, grooved director, dissecting forceps, flat retractor, an "S" sound, tape or a rubber drainage tube, sponges, oakum, antiseptic solution.

Usually no time to prepare animal for the operation. May cast, or operate on the standing animal. In latter case apply a ~~xxxxx~~ twitch to ear or lower lip and take up the opposite foreleg. Clip hair short and make skin antiseptic.

1. **THE INCISION:-** Wind the blade of a curved bistoury from handle to within an inch of the point with cotton or oakum. The bistoury is grasped in the full hand (5th. position), the unwound portion of the blade projecting from between the thumb and index finger. The knife is held in the left hand when the left pouch is to be operated upon, and in the right hand on the right pouch. With the free hand draw the skin backward about an inch. Make the incision parallel to and upon the extreme anterior border of the atlas, so as to include the lower $\frac{2}{3}$ of the middle third, and the upper $\frac{1}{3}$ of the lower third of this anterior border of the transverse process of the atlas. Cut to the bone with one incision, because two small nerve branches are in line of incision and pain will thus be only momentary. With the finger tear down connective tissue and expose tendon of splenius and complexi muscles. This may be cut through or lifted up. Raise this fascia and work the index finger inward and forward behind the parotid gland and it soon comes upon the two surgical landmarks of this region, viz:- the yielding process of styloid bone, and above and posteriorly the unyielding styloid process of the occipital bone. Apply the retractor.

2. **PUNCTURE:-** through the occipito-styloid muscle just above the border of the process of the styloid bone. Pass the index finger of the left hand into the incision till the finger tip rests on the yielding process of styloid bone, then pass a straight bis-

toury carefully in above the finger till its point rests against the occipito-styloid muscle. Now withdraw the finger and turn cutting edge of bistoury towards the horse's mouth, the direction of the bistoury being toward the eye of the opposite side. Puncture with a quick, strong thrust and the pouch will be opened, the edge of the bistoury impinging on the styloid bone.

3. Pass "S" sound into the pouch, through its fundus and down to the angle of the jaw where it will be felt under the skin. Cut a button hole through skin at this point, push the sound through, thread it with tape or drainage tube and draw downwards. Do not tie ends of drainage tube or tape together, for the animal may catch the loop on the stall and do himself injury, but put a knot on each end, after thoroughly washing the pouch with antiseptics.

After treatment consists in frequent washing of the pouch with warm antiseptic or astringent solutions and removal of drainage tube when discharge ceases. Keep wound dusted with iodoform till it closes.

C O L L E C T I O N O F S I N U S E S .

Frequent and due to accumulation of pus from a chronic suppurative inflam. of the mucous memb. lining the sinuses.

ANATOMY OF SINUSES:- "The sinuses are very irregular cavities in the substance of bones of head on the limits of the cranium and face. They are diverticuli of the nasal fossae, are pairs, five on each side: the frontal, supermaxillary, sphenoidal, ethmoidal, and inferior maxillary sinuses. The first four communicate; the last is usually perfectly isolated."

FRONTAL SINUS:- "Situated at inner side of orbit, and formed by the frontal, nasal, lachrymal and ethmoidal bones. It joins the supermaxillary sinus by a large opening near inner canthus of the eye. An imperforate plate separates it from sinus of opposite side.

SUPERMAXILLARY SINUS:- "Beneath the orbit and formed by the maxillary, zygomatic, ethmoid and lachrymal bones; this sinus is the largest and is divided into two compartments by the maxillo-dental canal. The inner compartment is shallow and continuous with the sphenoid sinus, and also by a narrow slit penetrates the ethmoidal sinus. The external compartment is separated in front from the maxillary sinus by a thin but always imperforate partition, and is prolonged backwards into the maxillary protuberance and contains the roots of 5th. and 6th. molars.

INFERIOR MAXILLARY SINUS:- "Does not communicate with the others. It is divided into two compartments: an internal and an external showing the roots of the fourth molar, rarely those of the third. Supposing the head to be vertical, it does not extend, in the adult horse below the lower extremity of the maxillary ridge, in front of which one must trephine in order to reach its interior.

COMMUNICATION OF SINUSES WITH NASAL FOSSA:- "All sinuses of one side join the nasal fossa through a curved slit at bottom of middle meatus. This slit penetrates the supermaxillary sinus, under the septum that separates it from the frontal sinus; it also enters the inferior maxillary sinus, which thus communicates solely with the nasal cavity, while the other sinuses open in common into the nasal cavity through the medium of the superior maxillary sinus."

ETIOLOGY:- Local and General.

I. LOCAL CAUSES are all traumatic.

1. Fractured bone, or a bone callous irritating the lining mucous membrane.
2. Decay of teeth causing alveolar periostitis and finally osteitis and inflam. of mucous m. (Roots of 3rd. upper molar are near trigeminal nerve and any necrosis of this tooth may affect the nerve and cause intense pain).
3. Cold water injected into one sinus may perhaps induce inflam. in the other.
4. Exploratory puncture with a gimlet in suspected cases, by pushing the mucous memb. away from wall of the sinus.
5. Cysts (rarely). Epithelioma in sinuses is often diagnosed as a purulent collection.

II. GENERAL CAUSES:- Strangles and Glanders.

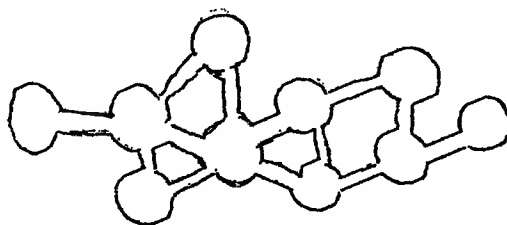
SYMPTOMS:- Well marked.

1. DISCHARGE. (a) In acute stage is a clear mucus, not abundant, often of color of prune juice from slight hemorrhages.
 (b) In chronic stage is lumpy and flocculent and contains epithelial cells and fibrin.
 (c) Odor of chronic discharge is offensive, especially if dental decay exists.
 (d) May be profuse at work, owing to increased respiration, and may be nil at rest.
 (e) Seen only on compromised side.
2. SUBMAXILLARY GLANDS.

As a whole these glands are hard, lobulated, non-adherent to skin or bone.



Gland of Collec. Sinuses



Gland of Glanders

3. DULLNESS ON PERCUSSION:- Due to thickened mucous membrane and pus and mucus in sinus. Any neoplasm, as myxoma, epithelioma, etc., may cause the same. When tumefaction exists over the sinuses it is due either to swelling of tissues external to the bone from traumatism, or to absorption of walls of sinus under the pressure of a neoplasm within the sinus. Owing to the communication with nasal fossa, pus would escape from sinuses before pressure upon it was sufficient to cause absorption of sinus walls with consequent bulging. May employ a pleximeter or the fingers.

4. PAIN ON PERCUSSION.

5. EXPLORATORY PUNCTURE with gimlet if the diagnosis is still in doubt. Wound heals rapidly.

DIFFERENTIAL DIAGNOSIS:-

GLANDERS.

1. Discharge. Thin, oily, bloody.
2. " Slight increase on exercise.
3. " Sticks around nostril.
4. Wing of nostril rigid.
5. Stellate cicatrices or irregular "punched out" ulcers in a leaden, ashy Schneiderian membrane which adheres to nasal septum.
6. Submax. glands hard, adherent to skin and bone and feel like bullets attached to short pedicles.
7. Sinuses resonant on percussion.
8. General condition poor.
9. Temperature moderately elevated.
10. No pain on percussion.

COLLEO. SINUSES.

- Clear mucus, or flocculent and lumpy. May be bloody.
- Marked increase on exercise.
- Runs from lower commissure.
- Normal.
- Schneiderian membrane normal in structure, color and pliancy.
- Firm, irregular, lobulated, non-adherent.
- Dull.
- Unimpaired.
- Normal.
- Pain.

Bulging of sinus denotes a neoplasm in which case all its roots must be taken away clean. If a cyst, it will yield to ordinary treatment; injections of Iodine, etc.

PROGNOSIS:- Grave, for no tendency to get well. Discharge changes from opalescent and liquid character to a cheesy, flocculent, and opaque one, and the mucous membrane may become from 1/2-1 inch thick.

TREATMENT:- 1. Fumigation may reach turbinated bones, but not the sinuses. Good only to allay inflam. of mucous membs. of respiratory tract, as in early stage of pneumonia.

2. Surgical operation. Open frontal or inferior sinus or both. May cast the animal, or use cocaine and operate standing. Apply a twitch to lower lip, and take up opposite fore foot.

Frontal sinus is trephined at a point midway on a straight line drawn from internal canthus of eye perpendicular to median line of the cranium and face.

Inferior sinus is trephined in the angle formed by the zygomatic ridge and a line drawn from its extremity perpendicular to median line of the face. With curved scissors we can break through the fragile septum which separates this sinus from the supermaxillary. Often in aged animals it consists merely of two mucous membs. in apposition.

Superior maxillary may be trephined about 1 1/2 inches above where lower sinus is opened. In opening any sinus make a right-angled incision with a bistoury through the skin, subcutaneous tissue and periosteum so that the point of the flap will be downward. With the thumb nail or handle of bistoury carefully push back the periosteum of the flap and expose the bone. Neither a "U" nor an "I" incision is so desirable as the "V" incision. The latter leaves less scar and heals more quickly.

In using the trephine allow the central stylet to project 1/16 inch till instrument has made a circular groove, then slip it back. Do not exert much pressure, especially when near the lining membrane of the sinus or the disc of bone may be suddenly pushed into the sinus and the mucous membrane loosened from a considerable extent of the wall, with consequent necrosis of bone. When through the bone, carefully lift out the disc, and smooth edge of bone with a penknife.

Wash out the pus, and inject an antiseptic wash. Best results follow the use of several antiseptics. Use weak solution of creoline, the next day use Potass. Permang., the 3rd. day Corrosive Sublimate, &c. Astringents are useful. If necrosis of bone exists inject a 1% solution of Sulphuric Acid; for the atomizer use a 2% solution.

Atomizer carrying a 2% Sulphuric acid spray is useful for its local action where an acrid discharge from sinuses has eroded turbinated bones, or has gone further and caused necrosis. Iodine injections may accomplish same results. Iodine or zinc sulphate may be used in 5% strength, Chloral 5-10%, Creoline or Carbolic acid 5%, Potass. Permanganate any strength.

Much care and patience necessary, and from 6-8 weeks time for a cure. To facilitate washing and drainage insert a drainage tube having holes along sides.

Only warm liquids should be injected into sinuses.

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- ADENITIS:-** (Gr. aden- a gland). Inflammation of a gland.
- ADIPOSE:-** (L. adeps- fat). Relating to fat. Fatty.
- AETIOLOGY:-** (Gr. aitia- cause, & logos- treatise). The doctrine of the causation of disease.
- ALIMENT:-** (L. alimentum). Nutritive material.
- ALVEOLAR:-** (L. alvus- belly, & ulus- small). Having small cavities.
- ANAEMIA:-** (Gr. an- without, & haima- blood). Decreased quantity of blood, or of its red corpuscles, in vessels of a part, or of the whole body.
- ANAESTHETIC:-** (Gr. an- without, & aisthesis- feeling). An agent which destroys sensation. It may be general, acting upon central nervous system, or local, abolishing sensibility of peripheral nerves of a particular area.
- ANALOGUE:-** (Gr. ana- according to, & logos- proportion). That which resembles, or has the same function as, some other part or organ.
- ANASARCA:-** (Gr. ana- without, & sarx- flesh). Dropsy affecting all tissues of a part, or of whole body.
- ANASTOMOSIS:-** (Gr. ana- through, & stoma- mouth). Union of two vessels, or of two nerves, by which they become continuous.
- ANEURISM:-** (Gr. aneuruno- to enlarge). A tumor containing blood or fibrin, due to rupture or abnormal dilatation of coats of an artery, with tube of which it communicates.
- ANFRACTUOUS:-** (L. anfractus- winding). Bending or winding, especially applied to the furrows of the brain.
- ANGINA:-** (Gr. angcho- to strangle). Sense of suffocation. A. Tonsillae- tonsillitis.
- ANGIOMA:-** (Gr. angegeion- vessel, & oma- tumor). A tumor formed chiefly of vessels or of spaces connected with vessels, arterial, venous, capillary or lymphatic.
- ANKYLOSIS:-** (Gr. ankula- a clasp). Abnormal immobility of a joint; morbid adhesion of contiguous articulating surfaces, whether mobile or not. It may be complete or incomplete, osseous, ligamentous or fibro-cellular.
- ANODYNE:-** (Gr. an- without, & oduna- pain). An agent which relieves pain by diminishing sensibility.
- ANTI-PHLOGISTIC:-** (Gr. anti- against, & phlego- to burn). Opposed to, or tending to check, inflammation.
- APONEUROSIS:-** (Gr. apo- from, & neuron- tendon or nerve). A thickened band or sheet of connective tissue belonging to fascial apparatus.

A

- AQUEDUCTUS SYLVII:** Aqueduct of Sylvius. Narrow canal connecting third with fourth ventricle. It is that portion of the cerebro-spinal central canal belonging to the middle brain.
- ARACHNOID:-** (Gr. arachnion- spider's web, & eidos- like).
A. Membrane. A delicate membrane between pia mater and dura mater of brain and spinal cord.
- AREOLA:-** 1. Interstitial spaces in connective tissue.
 2. Ring-like discoloration of the skin.
- ARTHRITIS:-** (Gr. arthron- a joint). Inflammation of the structures of a joint; also gout.
- ASCITES:-** (Gr. askos- a bag). Abdominal dropsy.
- ASPHYXIA:-** (Gr. a- without, & sphuxis- pulse). Pulseless. Condition produced by deficiency of oxygen in the blood: absence of respiratory movement.
- ASPIRATOR:-** (L. aspiratio- to breathe into). An instrument for drawing fluids from the body into a vessel in which a partial vacuum has been formed by means of an exhausting pump or syringe.
- ASTHENIC:-** (Gr. a- without, & sthenos- strength). Weak; Feeble.
- ASTRINGENT:-** 1. An agent which causes contraction of tissues and lessens secretion from the part to which it is applied. 2. Tending to contract or bind; styptic.
- ATHEROMIA:-** (Gr. athera- gruel). An encysted tumor containing a soft substance, usually more or less disintegrated epithelium.
- ATROPHY:-** (Gr. a- without, & trophe- nourishment). Decrease in size of an element, a tissue, or an organ with corresponding loss of power.
- AUSCULTATION:-** The act of listening to determine presence and nature of sounds in the body.
- AUTOPSY:-** (Gr. autos- self, & opsus- inspection). Anatomical examination of a corpse to ascertain the cause of death. "Post-mortem".

B

- BENIGN:-** Mild; not malignant.
- BISTOURY:-** (From Pistori, a town where it was made). Small surgical knife; blade of which may be fixed or movable, straight or curved, sharp or probe-pointed.
- BOUGIE:-** Instrument for introduction into urethra, oesophagus, or other canal to dilate or remove obstructions.
- BRUIT:-** (Fr. bruit- noise). A noise; applied especially to sounds heard by auscultation.

B

- BUBONŌCELE:-** (Gr. boubon, & kele- tumor). Obliqueinguinal hernia, protruding through internal ring, but not through external ring.
- BUBO:-** (Gr. boubon- the groin). Inflammatory enlargement of a lymphatic gland, especially an inguinal gland.
- BURSA:-** (Gr. bursa- purse). Any pouch or sac; but usually applied to synovial spaces formed in connective tissue of body by pulling or sliding stress.

C

- CACHEXIA:-** (Gr. kakos- bad, & hexis- habit). A depraved or defective condition of nutrition due to constitutional causes, such as cancer, syphilis etc.
- CAECA:-** (L. caecus- blind). Tubes with one end closed. Caecum.
- CALCIFICATION:-** (L. calx- lime, & fio- to become). Molecular deposit of lime salts in a tissue.
- CALLOUS:-** (I. callo- corn). Hard. Insensible.
- CALLUS:-** Bony tissue formed around and between the ends of a broken bone in process of repair.
- CANCER:-** 1. Carcinoma. 2. Malignant tumor.
- CANCROID:-** Resembling cancer; epithelioma.
- CANNULA:-** A small tube, usually of metal or India rubber.
- CANTHUS:-** (Gr. kanthos- the angle of the eye). Angle formed by meeting of upper and lower eye-lids.
- CAPILLARY:-** (L. capillus- hair). 1. hair-like. 2. A capillary blood vessel.
- CARCINOMA:-** A tumor composed principally of epithelial elements arranged in alveoli surrounded by connective tissue stroma.
- CARIES:-** A disease of bone analogous to ulceration in soft parts.
- CASEOUS:-** (L. caseum- cheese). Cheesy; relating to, or resembling cheese.
- CATALEPSY:-** (Gr. kata- down, & lapsis- a striking). A functional nervous disease characterized by partial or complete suspension of consciousness and volition, with rigidity of voluntary muscles, so that a limb remains in the position in which it is placed.
- CAUTERY:-** A substance used for burning or disorganizing living tissues. 1. Actual C. Fire, direct heat, or hot iron. 2. Potential C. any caustic except fire or the hot iron.
- CHAMPIGNON:-** (Fr.). Mushroom. Fungus. A fungoid or mushroom growth.

C

- CHOLESTERIN:-** (Gr. chola- bile, & stearos- stearin). A tasteless, fatty substance occurring in the brain, nervous system and blood; probably excreted in bile, occasionally found in urine of fatty kidney.
- CHONDRITIS:-** (Gr. chondros- cartilage). Inflammation of cartilage.
- CHRONIC:-** (L. chronicus). Long continued; of slow progress.
- CICATRIX:-** (L.). A new formation of tissue uniting solutions of continuity, or taking the place of losses of substance.
- CLINIC:-** (Gr. kline- a bed). The teaching practical medicine and surgery at the bedside, or from actual patients, as in a dispensary.
- CLONIC:-** (Gr. klonos- tumult). Irregular, not persistent.
- CLYSTER:-** (Gr. kluzo- to wash away). An enema, clyster.
- COLIC:-** 1. Paroxysmal griping pain in the belly.
2. Pertaining to the colon.
- COLLOID:-** (Gr. colla- glue, & eidos- like). Like glue. The gelatinous substance formed in colloid degeneration. C. Degeneration is that form in which the cells of a tissue change into a glutinous, transparent, mucoid substance, soluble in water, unaffected by acetic acid.
- COMMINUTED:-** Broken into many fragments.
- COMMISSURE:-** The point of union of two contiguous parts, or the structure by which they are united.
- CONTAGION:-** (L. con- together, & tango- to touch). The process by which specific disease is transmitted. If by direct contact, it is called personal contagion; if indirect, it is often called infection.
- CONTUSION:-** (L.). A bruise; a mechanical injury producing no apparent severance or rupture of the tissues.
- CORYZA:-** (Gr. choruza- catarrh). Inflammation of mucous membrane of the nose; cold in the head.
- COSMOLINE:-** A trade name for petrolatum (petroleum ointment). Vaseline.
- CREPITANT:-** (L. crepito- to crackle). Emitting a crackling sound, or sensation to the touch.
- CRYPTORCHIS:-** (Gr. krupito- to conceal, & orchis- testicle). One whose testicles have not descended from the abdomen or inguinal ring into the scrotum. Vulgarly, a "ridgeling".
- CUL-DE-SAC:-** (Fr.). A blind pouch.

C

- CURETTE:-** (Fr.). A name applied to various spoon-shaped instruments or scoops used for removal of fragments of stone after lithotomy; for scraping the interior of cavities; for removing lense in extraction of cataract, etc.
- CYST:-** (Gr. kustos- bladder). A circumscribed membranous cavity occurring abnormally in the body, containing fluid, semifluid, fatty, or solid matters, rarely pus.
- CYSTOCELE:-** (Gr. kustos- bladder, & kele- tumor).
 1. Hernia of the bladder.
 2. Relaxation of anterior wall of vagina.

D

- DEGLUTITION:-** Swallowing.
- DELITESCENCE:-** (L.). The state of being hid, or concealed.
- DEPLETION:-** To empty; to remove fluids from the body; blood letting.
- DERMOID:-** (Gr. derma- skin). Skinlike. D.Cyst, a cystic tumor containing dermal tissue, teeth, hair, etc.
- DIAGNOSIS:-** (Gr. dia- through, & gnosco- to recognize). Distinguishing, as of one disease from another; also concise account of peculiarities of a thing.
- DIAPYCNESIS:-** (Gr. dia- through, & pycno- to walk). Passage of blood corpuscles from blood vessels without rupture of latter.
- DIAPHYSIS:-** That part of a bone formed from principal primary centre of ossification.
- DIATHESIS:-** (Gr. diatithami- to arrange). A state or condition of the body which predisposes it to certain forms of disease.
- DIARRHOEA:-** (Gr. dia- through, & rhoea- to flow). Too frequent passage of too fluid stools.
- DICROTIC:-** (Gr. dis- twice, & kroteo- to strike). Double-beating. D.Pulec, a pulse having a double beat for each cardiac systole.
- DIURETIC:-** Causing an increase in the secretion of urine.
- DIVERTICULUM:-** (L.). A blind pouch or passage opening into a main cavity or tube.
- DROPSY:-** An abnormal accumulation of serous fluid in a cavity of the body, or in the meshes of areolar tissue.

E

- ECCHYMOSIS:-** (Gr.). Discoloration produced by effused blood from rupture of small vessels.

E

- ECZEMA:-** (Gr.) An inflammatory disease of the skin with diffuse redness and exudation, or with papules, vesicles or pustules, followed by weeping or scaling, and accompanied usually by much itching.
- ELEPHANTIASIS:-** 1. A circumscribed chronic hypertrophy of the skin and subcutaneous tissue, due to local circulatory disturbances from repeated vascular and lymphatic obstruction, producing an immensely enlarged, thickened, indurated, pigmented condition of the skin of a part, usually a limb.
2. A cutaneous disease of cattle.
- ELIMINATION:-** (L. ex- out of, & limen- threshold). The act of separating and expelling.
- EMBOLUS:-** A clot formed in one place, and transported by the blood to another locality.
- EMBRYO:-** The fecundated germ of an organism while it remains within the membranes of the ovum. In man the embryo after the third month is called the foetus.
- EMOLLIENT:-** (L. emollio- to soften). Having power to soften and relax; an agent having such power.
- EMPHYSEMA:-** (Gr. emphusao- to inflate). The condition, or the tumor resulting from infiltration of air into areolar connective tissue.
- ENCEPHALOID:-** (Gr. encephalos- brain, & eidos- like). Resembling brain; term applied to soft carcinoma or sarcoma.
- ENCHONDROMA:-** (Gr. en- in, & chondros- cartilage, & oma- tumor). 1. A tumor composed of cartilage developing in the shaft of a bone. 2. Chondroma.
- ENDOCARDIUM:-** (Gr. endon- within, & kardia- heart). The lining of the heart cavities; similar in structure to endothelium of inner coat of great vessels, with which it is continuous.
- ENERVATION:-** (L. enervo- to exhaust). 1. The condition produced by nervous exhaustion. 2. Neurotomy.
- ENEMA:-** (Gr. en- within, & hiami- to place). A liquid preparation intended for injection into the rectum or large intestine by means of a syringe or other suitable apparatus; clyster, lavement, injection.
- ENTERITIS:-** (Gr. enteron- intestine). Inflammation of the small intestine.
- ENTEROCELE:-** (Gr. enteron- intestine, & kele- tumor). Hernia containing only intestine.
- ENTEROMPHALOCELE:-** (Gr. enteron- intestine, & omphalos- umbilicus, & kele- tumor). Umbilical enterocele.

E

- EPIDIDYMU**S:- (Gr. epi- upon, & didymi- the testicles). An oblong body at upper and posterior part of the testicle, composed of coils of its efferent duct.
- EPIPHYSIS**:- (Gr. epi- upon, & physis- a growth). Part of a bone formed from a secondary or tertiary centre of ossification. It may for some time have only a cartilaginous union with the shaft of the bone.
- EPIPLOCELE**:- (Gr. epiploön- omentum, & kele- tumor). Hernia containing only omentum.
- EPIPLOMPHALOCELE**:- (Gr. epiploön- omentum, & omphalos- umbilicus, & kele- tumor). Umbilical hernia containing omentum.
- EPITHELIOMA**:- (Gr. epi- upon, & thele- nipple, & oma- tumor). Carcinoma originating in epithelium.
- ERYSIPELAS**:- (Gr. erythros- red, & pella- a skin). An infective inflammatory disease of the skin and adjacent mucous membranes, with fever and rapid extension. It is probably due to a specific microorganism.
- ERYTHEMA**:- (Gr. erythaino- to redden). A hyperaemic skin disorder, characterized by redness in diffused or circumscribed non-elevated patches.
- EVENTRATION**:- The condition produced by the escape of a large part of the abdominal viscera from the natural cavity, in a large ventral hernia, or through an abdominal wound.
- EXCORIATION**:- (L. ex- out of, & corium- skin). An abrasion.
- EXFOLIATION**:- (L. ex- out of, & folium- a leaf). The separation or scaling off of a thin layer of dead tissue.
- EXOMPHALOCELE** } (Gr. ek- out of, & omphalos- umbilicus, & kele-
or **EXOMPHALUS** } tumor). Umbilical hernia.
- EXOSTOSIS**:- (Gr. ex- out of, & osteon- bone). An osseous tumor growing on bone or cartilage.
- EXTIRPATION**:- (L. ex- out of, & stirps- root). The total ablation or destruction of a part or tumor by a surgical operation.
- EXTRAVASATION**:- (L). 1. the escape of a fluid from its normal receptacle into or between the neighboring tissues. 2. Hemorrhage. 3. Exudation.
- EXUBERANT**:- (L). Growing in excess.

F

- FASCICULATED**:- Arranged in fascicles (bundles).
- FASCIA**:- (L). Sheet-like appendages to the muscular system, composed of varieties of connective tissue.
- FEBRILE**:- (L. febris- fever). Pertaining to fever, feverish.
- FEMORAL**:- (L. femur- thigh). Relating to the femur or thigh.

F

- FIBRINOPLASTIC:-** (Gr. fibrin, & plasso- to form). Having power to form fibrin.
- FIBRINOPLASTIN:-** Paraglobulin. Serum-globulin. Obtained from blood-serum, and supposed to exist in white blood-corpuscles.
- FIBROMA:-** A tumor formed of fibrous tissue.
- FISTULA:-** (L.) 1. An abnormal opening into a normal canal or organ. 2. A long, narrow canal of morbid origin, indisposed to heal.
- FLATULENCE:-** (L.) The accumulation of gas in the stomach or intestines.
- FLUCTUATION:-** (L.) Oscillatory movement of an enclosed mass of liquid.
- FOETOR:-** Bad odor, stink. Fetid, having an offensive smell.
- FOLLICLE:-** (L.) A small bag; used in anatomy to indicate either closed glands (lymphoid follicles) or tubular glands.
- FOMENTATION:-** (L. foveo- to warm). A liquid applied warm to a part of the body by means of a sponge or other absorbent material.
- FREMITUS:-** (L.) A vibration or thrill. When produced by the percussion of a hydatid cyst, it is known as hydatid fremitus. The vibration felt in the chest wall of a person speaking is known as vocal fremitus; that due to rhonchus (bronchial râles) is rhonchal fremitus.
- FRAENUM:-** (L. a rein). A bridle-like, restraining fold of mucous membrane or fascia. F.Linguae, a fold of mucous membrane which connects the under surface of the tongue with the floor of the mouth on the median line.
- FRIABLE:-** (L.) Easily broken in bits.
- FUNICULAR:-** (L. funis- rope, & ulus- small). Pertaining to a cord.

G

- GANGLION:-** ^{Gr.} (Ganglion- a nerve knot). 1. A discrete encapsulated portion of gray matter connected with a nerve. 2. A lymphatic gland. 3. A circumscribed tumor of the sheath of a tendon, containing synovial fluid.
- GANGRENE:-** (Gr. grao- to gnaw). Death of a part of the body in a visible mass, sometimes used to signify the first stage of mortification, sphacelus (complete death) being the second. When the dead parts

G

are dry and shrivelled, it is called dry gangrene; when they are moist and flabby it is called moist gangrene. See Hospital Gangrene; Mortification.

- GASTRITIS:-** (Gr. gaster- stomach). Inflammation of the gastric mucous membrane.
- GASTROSTOMY:-** (Gr. gaster- stomach, & stoma- mouth). 1. An operation for establishing a fistulous opening into the stomach through the abdominal wall. 2. The operation of opening the stomach by incision.
- GASTROTOMY:-** (Gr. gaster- stomach, & temno- to cut). Abdominal section. See Laparotomy.
- GONORRHOEA:-** (Gr. gonos- semen, & rhein- to flow). A specific contagious inflammation of the urethra or vagina, with muco-purulent discharge, usually propagated by venereal contact.
- GRANULATIONS:-** Reddish, bud-like projections on the surface of open wounds, formed from a tissue resembling an early stage of embryonic connective tissue.

H

- HAEMATOCELE:-** (Gr. haima- blood, & kele- tumor). A tumor consisting of extravasated blood, especially in the tunica vaginalis of the testicle.
- HAEMATOMA:-** (Gr.) A blood tumor.
- HAEMORRHAGE:-** (Gr. haima- blood, & ragnumi- to rupture). Escape of blood from blood vessels.
- HAEMOSTATIC:-** (Gr. haima- blood, & statikos- a stoppage). An agent which arrests hemorrhage; styptic.
- HEPATIZATION:-** (Gr. hepar- liver). Conversion of a tissue into a substance resembling liver.
- HEPATOCELE:-** (Gr.) Hernia of the liver.
- HERNIA:-** (Gr. hernos- a bud). Rupture. The protrusion of a viscus (soft organ) or part of a viscus from the cavity normally containing it. When unqualified, it ~~appears~~ applies to the viscera of the abdomen. A hernia is named from the region in which it appears.
- HERNIOTOME:-** (Gr. hernos- hernia, & temno- to cut). A blunt pointed bistoury, with only a small portion of its edge sharpened; used to divide the stricture in herniotomy.
- HOSPITAL GANGRENE:-** A highly infectious form of gangrene occurring in crowded hospitals.
- HOVEN:-** Acute tympanitis in cattle and sheep.
- HYALINE:-** (Gr.) Transparent, like glass.
- HYDROCELE:-** (Gr. hydor- water, & kele- tumor). A serous effusion around the testicle or spermatic cord. Sometimes applied to other circumscribed tumors contain-

H

- ing watery fluid, Hydrocele of the hernal sac.
- HYDROTHORAX:-** (Gr. hydor- water, & thorax). Presence of serous fluid in the pleural cavity.
- HYGROMA:-** (Gr. hygros- moisture, & oma- tumor). Cyst formed in a synovial cavity by hypersecretion.
- HYGROSCOPIC:-** (Gr. hygros- moisture, & skepeo- to observe). Capable of absorbing moisture.
- HYOVERTEBROTOMY:-** (Gr. hyo- pertaining to hyoid bone, L. vertebra, & Gr. temmo- I cut). An operation for removing collections of the guttural pouches.
- HYPOCHONDRIAC REGION:-** (Gr. hypo- beneath, & chondrium- cartilage (costal). That part of the abdominal cavity under the ribs on each side.
- HYPODERMIC:-** (Gr. hypo- underneath, & derma- skin). Relating to that which is or is done under the skin; subcutaneous.
- HYPERTROPHY:-** (Gr. hyper- above, & trophe- nourishment).
 1. The increase in size of an element, a tissue, or an organ, resulting from increased nutrition and assimilation, with no corresponding increase of waste. 2. Increase in size of a part, due to enlargement of its elements.

I

- ICHOROUS:-** (Gr. ichor- an acrid watery exudation). Pertaining to, or resembling ichor.
- IDIOSYNCRASY:-** (Gr. idios- self, & synkrosis- temperament). An individual peculiarity of constitution and susceptibility.
- IDIOPATHIC:-** (Gr. idios- self, & pathos- suffering). Spontaneous and independent; primary.
- INDURATED:-** (L.) Hardened; firmer or more solid than normal.
- INFARCT:-** (L.) 1. Obstruction of a canal or passage, especially of a blood vessel. 2. The result of sudden obstruction of a blood vessel supplying certain organs, being a circumscribed area of coagulation necrosis with intense congestion and hemorrhage.
- INFECTION:-** (L. inficio- to communicate). The act or process of infecting, formerly applied to communication of disease without personal contact; now often used as synonymous with Contagion, but is usually understood to refer to things rather than to persons; implies the presence of a virus or of bacteria.
- INFECTIOUS:-** Capable of infecting. A disease is said to be infectious when it can be communicated to another person.

I

- INFILTRATION:- (L.) The presence of a substance between or within the cells and tissues of a part. It may be serous, albuminous, calcareous, fatty, amyloid or cellular, and may or may not be accompanied by inflammation.
- INGUINAL:- (L. inguen- groin). Relating to the groin.
- INOCULATION:- (L.) Insertion of a known or suspected virus into the tissues of an animal or into a test-culture. When unqualified, refers to inoculation of small-pox virus.
- IMBIBITION:- (L.) The act of sucking in, or absorbing a fluid.
- IRITIS:- (L.) Inflammation of the iris.
- ISOCHRONOUS:- (Gr. isos- equal, & Chronos- time). Performed in the same time or in equal times - with the pulse wave.

K

- KERACELE:- (Gr. keras- horn, & kele- tumor). Horny tumor of hoof of horse.
- KERAPHYLLOUS:- (Gr. keras- horn, & phylla- a leaf). Relating to the horny laminae on inner surface of the wall of the hoof which dove-tail with the podophyllous tissue.
- KERAPHYLLOCELE:- (Gr. keras- horn, & phyllum- a leaf & kele- a tumor). Horny tumor on the podophyllous tissue of a horse's hoof.
- KERATITIS:- (Gr.- Inflammation of the cornea.
- KERATOCELE:- Hernia of inner layer of cornea through an ulcer of the external surface.
- KERATOGENOUS:- (Gr. keras- horn, & gennao- to produce). Forming horn or horny tissue.
- KERATOMA:- (Gr. keras- horn, & oma- tumor). A horny tumor of the cornea.

L

- LACERATE:- (L.) To tear. Jagged, torn.
- LACTEAL:- (L. lac- milk). pertaining to the lacteals, which are lymphatic ducts that collect chyle from the alimentary canal. Milky.
- LACUNA:- (L.) A pit, hollow, or gap.
- LAMINA, LAMELLA:- (L. lamina- leaf). A thin blade, sheet or leaf.
- LAMINITIS:- (L.) Inflammation of sensitive laminae of horse's foot.
- LAMPAS:- Swelling of the bars of the mouth of the horse.

L

- LAPAROTOMY:-** (Gr. lapara- loin, & temno- I cut). 1. the operation of opening the abdominal cavity by incision in the loin. 2. Abdominal section.
- LAUDABLE PUS:-** Creamy, sweet, inoffensive pus.
- LAXATIVE:-** (L. lax- loose). A mild cathartic, increasing slightly the action of the bowels and the frequency of the evacuations, without causing irritation.
- LESION:-** (L. laesio- I injure). Derangement or morbid changes in function or structure of a tissue or organ.
- LEUCOCYTES:-** (Gr. leukos- white, & kutos- cell). White blood-corpuscles.
- LIPOMA:-** (Gr. lipos- fat, & oma- tumor). A circumscribed or diffuse cutaneous or subcutaneous tumor composed of fatty tissue.
- LOBULATED:-** Composed of, or having lobes.
- LUMEN:-** (L.) The central vacant space of a tubular structure, which appears clear in cross-sections.
- LUXATION:-** (L.) Dislocation.
- LYMPHADENOMA:-** (Gr. lymph- lymph, & aden- gland, & oma- tumor).
1. A tumor which is histologically a collection of lymphatic follicles, with little tendency to return or to degeneration, liable to become extensively generalized, producing Hodgkin's disease. 2. Hypertrophy of a lymphatic gland.
- LYMPHANGITIS:-** (Gr. lymph- lymph, & angeion- vessel). Inflammation of the lymph vessels, with or without involvement of the glands.

M

- MACERATE:-** (L.) To keep a substance in a fluid for a considerable time, either to extract soluble matters or to promote decomposition of the soft parts.
- MALIGNANT:-** (L.) Dangerous to life; as applied to tumors it signifies cancerous.
- MALLENDERS:-** An old term for a scaly disease of the skin of the legs in horses; psoriasis of the carpus.
- MALPIGHI:-** Italian anatomist, 1628-94.
- MAMMITIS:-** (L. mamma- breast). Inflammation of the mammary gland.
- MEDULLARY:-** (L. medulla- marrow). Pertaining to marrow or to spinal cord.
- MELANOSIS:-** (Gr. melas- black). The deposit of dark pigment in the tissues; often the result of malaria.

M

- MELANOTIC:-MELANIC:-**Dark in color, pertaining to melanosis.
- MENINGITIS:-** (Gr. meninx- membranes of brain and spinal cord). Inflammation of the meninges, especially of the brain.
- MENSTRUATION:-** (Gr. men- month). A periodical disturbance in the female, manifested by increased vascular tension, pelvic hyperaemia, renovation of uterine mucous membrane, and a discharge of blood from the uterus.
- MESENTERY:-** (Gr. mesos- middle, & enteron- intestine). The double fold of peritoneum connecting the small intestine with the body-wall; the superior mesenteric vessels and their branches lie within its folds.
- METAMORPHOSIS:-** (Gr. meta- beyond, & morphe- form). Change in form or structure.
- METASTASIS:-** (Gr. meta- beyond, & stasis- arrest). The shifting of a disease or of its manifestations from one part to another, or to various organs of the body.
- MILIARY:-** (L. milium- millet seed). Like a millet seed in size or form.
- MORTIFICATION:-** (L. mors- death, & facere- to make). Loss of life in a part; gangrene.
- MYELITIS:-** (Gr. myelos- marrow). Inflammation of the spinal cord.
- MYELOPLAX:-** (Gr. myelos- marrow, & plax- cell). Term proposed by Robin for the giant-cells, or osteoclasts of bone marrow.
- MYXOMA:-** (Gr. myxa- mucus). A tumor composed of mucous tissue.

N

- NAVICULAR:-** (L. navis- boat, & Gr. scaphos- boat). Pertaining to the scaphoid bone of the horse's feet.
- NECROSIS:-** (Gr. nekros- death). Death en masse of a tissue, especially of a bone or a part of a bone.
- NEOPLASM:-** (Gr. neo- young, & plasma- form). A new growth characterized by histological diversity from the matrix in which it grows, and by its frequent tendency to increase.
- NEPHRITIS:-** (Gr. nephros- kidney). Inflammation of the kidney.
- NEUROMA:-** (Gr. neuron- nerve, & oma- tumor). 1. A tumor composed of nerve tissue. 2. A fibroma developed in the course of a nerve.

N

- NEUROTOMY:- (Gr. neuron- nerve; temno- I cut). Section of a ^{nerve.}
- * NICKING:- Operation of cutting through inferior coccygeal muscles of a horse's tail.

O

- OBESITY:- (L. obesus- fat). Condition of being unduly fat or corpulent.
- ODONTOMA:- (Gr. odons- tooth). 1. An irregular, wartlike neoplasm, composed of dentinal tissues arising from tooth germs or teeth. 2. A collection of crusta petrosa.
- OEDEMA:- (L.) Swelling due to abnormal accumulation of serous fluid in the interstices of the tissues.
- OMPHALOCELE:- (Gr. omphalos- umbilicus; kele- tumor). Umbilical hernia.
- OPHTHALMIA:- (Gr. ophthalmos- eye). Term used by the older writers for any inflammation of the eye, but especially for conjunctivitis.
- ORCHITIS:- (Gr. orchis- testicle). An inflammation of the testicle.
- OSCHEOCELE:- (Gr. oscheon- scrotum; kele- tumor). 1. Scrotal hernia. 2. Dropsy of the scrotum.
- OSTEOBLAST:- (Gr. osteon- bone; blastos- bud). A connective-tissue-cell about to be transformed into a bone-cell (corpuscle); the osteoblasts usually constitute a layer covering the surface of growing bone.
- OSTEOMA:- (Gr. osteon- bone; oma- tumor). A tumor composed of osseous tissue.
- OSTEOMALACIA:- (Gr. osteon- bone; malakia- softening). Morbid softening of formed bone.
- OSTEOPOROSIS:- (Gr. osteon- bone; poros- a pore). Interstitial absorption, producing a spongy condition in bones.
- OSTEOMYELITIS:- (Gr. osteon- bone; myelos- marrow; itis- inflammation). Inflammation, usually traumatic, of the medulla of bone.
- OSTEOPHYTE:- (Gr. osteon- bone; phuo- to grow). A circumscribed hyperostosis - hypertrophy of bone. (Not exostosis).

P

- PALPATION:- (L.) Exploration by the sense of touch applied through the hand or fingers.
- PAPILLA:- (L.) The nipple. By analogy, any small conical eminence, particularly of the skin or mucous membrane.

P

- PAPILLOMA:-** (L.) A surface growth whose general structure is the same as that of the papillae of the skin.
- PARIETES:-** (L. paries- a wall). Walls, enclosing tissues; boundaries.
- PAROTID:-** (Gr. para- beside; ous- ear). Near the ear; parotid gland.
- PAROXYSM:-** (Gr.) 1. Attack of a disease; fit. 2. Increase in symptoms to the highest point.
- PARTURITION:-** (L. pario- to bring forth young). Expulsion of the foetus at full term.
- PATHOGNOMONIC:-** (Gr. pathos- suffering or disease; gnomon- one who knows). Pertaining to the characteristic symptoms of a disease.
- PATHOLOGY:-** (Gr. pathos- disease; logos- treatise). The doctrine of disease, and especially of its nature and results.
- PERCUSSION:-** (L.) Striking a quick blow, so as to produce a sound from which to judge of the character of the organ beneath.
- PERINEUM (PERINAEUM):-** (Gr.) That triangular region of the body corresponding to the outlet of the pelvis, and determined by ~~imaginary~~ the anus and ischial tuberosities.
- PERIOPLE:-** The thin, dense and polished layer of horn overlaying the wall of the hoof.
- PERISTALSIS:-** (Gr. peri- about; stello- I send). A peculiar rythmical, vermicular (worm-like) motion of a muscular tube, by which the contents are pushed forward.
- PERITONITIS:-** (Gr. peri- around; teino- I stretch; itis- inflammation). Inflammation of the peritoneum.
- PERIVASCULAR:-** (Gr. peri- around; vas- a vessel). Around a vessel.
- PHLEBITIS:-** (Gr. phleps- a vein). Inflammation of a vein.
- PHLEGM:-** flem. (Gr) Viscid mucus from the upper air-passages or the stomach.
- PLASTIC:-** (Gr. plasso- to mould). Pertaining to formation or nutrition.
- PLETHORA:-** (Gr. pletho- I fill). Excessive fulness of the blood vessels.
- PIEURISY or PLEURITIS:-** Inflammation of the closed serous sac, (pleura) surrounding the lungs.
- PNEUMONIA:-** Inflammation of the lungs.
- PODOPHYLLOUS MEMBRANE:-** (Gr. pous- foot; phylla- leaf). Laminae of the third phalanx.
- POLYPUS:-** (Gr. polus- many; pous- foot). A tumor arising from a mucous or serous membrane, more or less

P

pediculated, and projecting into one of the natural cavities, such as the nasal fossae, uterus, rectum, etc.

POST-PARTUM:- (L. post- after; pario- I bear). After labor.

PRODROME:- (Gr.) That which goes before; precursor. A sign of disease to follow.

PROGNOSIS:- (Gr. pro- before; gignosko- to perceive). Knowledge or prediction of that which will occur in the course of a disease.

PROLIFERATION:- (L. proles- offspring; fero- to bear). Budding, gemmation. Reproduction; cell-division.

PSORIASIS:- (Gr. psora- scabies, itch). A chronic affection of the skin characterized by the formation of patches of slightly adherent lamellae of whitish epithelial scales on a thickened, reddened and easily bleeding base.

PULMONARY:- (L. pulmo- lung). Relating to the lungs.

PURULENT:- (Gr. pyon- pus). Containing, resembling or producing pus.

PYAEMIA:- (Gr. pyon- pus; haima- blood). A febrile affection due to absorption of pus or pus-poison, and characterized by the production of metastatic abscesses or diffuse inflammations in various organs.

PYOGENIC or PYOGENETIC:- (gr. pyon- pus; gennao- to produce). Pus-producing, suppurative.

Q

Quitter:- A fistulous unhealthy sore or wound on the quarters and heels of the coronet of the horse's hoof.

"QUACK":- One who publicly professes to have knowledge and skill which he does not possess. The term is thus quite comprehensive.

R

RALES:- (Fr.) Rattles; sounds of a bubbling character, often called moist sounds or râles, produced in the bronchial tubes. They are of many kinds.

RESOLUTION:- (L.) The ~~general~~ Gradual disappearance of swelling without the formation of pus.

RETICULAR:- (L. rete- net). Net-like.

REVULSION:- (L. revello- to drive away). The drawing of the humors, etc., away from a diseased part; derivation; counter-irritation.

RICKETS:- (Gr. rachis- back-bone). A disease of infancy and childhood characterized by defective ossification of various parts of the skeleton, and consequent deformity.

S

- SALLENDERS:-** Psoriasis of the hock in horses.
- SARCOCELE:-** (Gr. sarx- flesh; kele- tumor). Fleishy tumor of the testicle.
- SARCOLEMMMA:-** (Gr. sarx- flesh; lemna- covering). The colorless, structureless, transparent elastic sheath of muscle-fibres.
- SARCOMA:-** (Gr. sarx- flesh; oma- tumor). A tumor composed of embryonic connective tissue. The chief divisions are - spindle-cell, round-cell, giant-cell and melanotic sarcoma.
- SCARIFICATION:-** (L. to make cicatrices). The act or operation of making a number of small shallow incisions on the surface of a part.
- SCIROSIS:-** (Gr. skleros- hard, firm). Induration of tissues by formation of connective tissue.
- SCIRRHUS:-** (Gr. skirros- hard). Indurated; affected with, or resembling, scirrhus.
- SCIRRHUS:-** (Gr. skirros- hard). A firm, hard tumor; generally a firm fibrous carcinoma.
- SEFACEOUS:-** (L. sebum- fat). Resembling or furnishing fat.
- SEFILE:-** (L. senilis- old). Pertaining to old age.
- SEPTIC:-** (Gr. sepsis- putrefactive poison). Pertaining or due to putrefaction.
- SEPTICAEMIA:-** (Gr. sepo- I poison; haima- blood). A febrile affection due to absorption of putrid substances or products of pus-formation; emboli of micrococci are found after death.
- SEQUELA:-** (L.) That which follows or succeeds; result.
- SEQUESTRUM:-** (L.) A dead fragment of bone, the result of necrosis.
- SETON:-** (L. seta- bristles). Strands of silk, hair or other materials drawn through a fold of skin, and left there to produce continuous counter-irritation.
- SINAPISM:-** (Gr. sinapi- mustard). A cataplasm (poultice) composed wholly or in part of mustard flour.
- SINUS:-** (L.) 1. A cavity of considerable size, having a comparatively small opening. 2. A venous canal formed between two layers of the dura mater of the brain. 3. A narrow opening leading to diseased structure.
- SPAY:-** (Gr. spao- to remove). To remove the healthy ovaries.
- SPECIFIC:-** (L. species- particular kind; facere- to make).
 1. Peculiar; possessed of distinguishing qualities.
 2. Possessing especial curative power against a single disease. 3. A specific remedy.

S

- SPECULUM:-** (L.) An instrument to be introduced into the openings of canals, such as the vagina, rectum, nose or ear, to permit a view of the interior or to dilate the cavity.
- SPEEDY CUT:-** An injury of the fore-leg of the horse by the opposite fore-foot.
- SPICULA:-** (L.) A small spike or sharp-pointed fragment.
- SPLENOCELE:-** (Gr. splen- spleen; kele- tumor). Hernia of the spleen.
- "STAGGERS":-** A term applied to disordered locomotion in the horse, which may be due to inflammation of the brain, to uraemic poisoning, to distension of the stomach etcetera.
- "STALEING":-** Old term for urination of the horse.
- STASIS:-** (Gr.) Stagnation of the blood with coagulation in the capillaries and small vessels.
- STERILIZATION:-** (L. making unfruitful). The depriving of vitality of all organisms or germs in or on a surface, a fluid, or a substance, by heat or other disinfectants.
- STETHOSCOPE:-** (Gr. stethos- breast; skopeo- to examine). An instrument to convey to the ear sounds produced in the heart, lungs or other viscera.
- STHENIC:-** (Gr. sthenos- strength). Strong.
- STIFLE-JOINT:-** Femoro-tibial joint of the horse.
- STONA:-** (Gr.) mouth .
- STRING-HALT:-** An irregular convulsive action of the muscles of the hind-legs in the horse; a species of chorea.
- SUB-ACUTE:-** Midway between acute and chronic in violence and rapidity of development.
- SYMPYSIS:-** (Gr. syn- together; physo- to grow). Close union, especially that, either bony or cartilaginous of two skeletal integers.
- SYMPTOMATOLOGY:-** The science of symptoms. Diagnosis, semeiology.
- SYNOVITIS:-** Inflammation of synovial membranes.

T

- TAXIS:-** (Gr.) The methodical use of manipulation and pressure in the reduction of hernia.
- TENESMUS:-** (Gr. teino- I stretch). Painful contraction of the sphincter ani or neck of bladder, with straining and sense of desire for defecation and micturition.
- TENOTOME:-** (Gr. tenon- tendon; temno- I cut). A small narrow-bladed knife used in tenotomy.
- TENOTOMY:-** (Gr.) The cutting a tendon.

T

- THROMBUS:- (Gr.) A clot formed during life in the vascular system; formerly used to mean a small clot of extravasated blood under the skin.
- TOURNIQUET:- (Fr. windmill). An instrument for compressing an artery.
- TRANSUDATION:- 1. Passage of the fluid constituents of the blood through the vascular walls. 2. A dropsical accumulation.
- TRAUMATISM:- (Gr. trauma- wound). The condition of the system produced by a wound.
- TREPHINE:- (Gr. trepo- to turn). A form of saw for cutting out a circular disc of bone.
- TROCAR:- An instrument consisting of a perforator enclosed in a metal tube, used for evacuating fluids from a cavity.
- TUMEFACATION:- Swelling.
- TUMOR:- (L.) 1. A circumscribed new formation of tissue, not due to inflammation and not fulfilling any physiological purpose, but existing as a more or less independent structure. 2. Swelling.
- TYMPANITES:- (Gr.) Distension of abdomen by gas in the intestines or stomach.

U

- UNCIPRESSURE:- (L. uncus- hook). Control of arterial hemorrhage by pressure with pins or hooks against adjoining tissues.
- UNGUIS:- (L.) A nail.

V

- VAGINITIS:- Inflammation of the vagina.
- VARIX:- (L.) Permanent dilatation of a vein, with or without hypertrophy of its walls.
- VARICOSE:- Affected with varix.
- VASCULAR:- (L. vas- vessel). Pertaining to, or containing vessels.
- VENESECTION:- Opening a vein; blood letting.
- VERMICULAR:- (L. vermis- worm). Resembling a worm in appearance or movement.
- VESICANT:- (L. vesica- bladder, cyst). An irritant sufficiently powerful to cause exudation between the epidermis and the true skin, forming vesicles.
- VETERINARY:- (L. veho- to carry or bear). Pertaining to beasts of burden.

V

- VIBRIO:- A spiral form of bacillus.
- VIRUS:- (L.) A substance, the result of a morbid process, capable of producing disease when inoculated; the active agent in the production of any infectious disease.
- VISCUS:- (L.) pl. VISCERA. Term applied to organs contained within the three great cavities of the body, cranial, thoracic and abdominal, particularly those of parenchymatous (glandular) nature.

Z

- ZYMOTIC:- (Gr. zymoo- to ferment). Relating to, or capable of producing, fermentation.

